



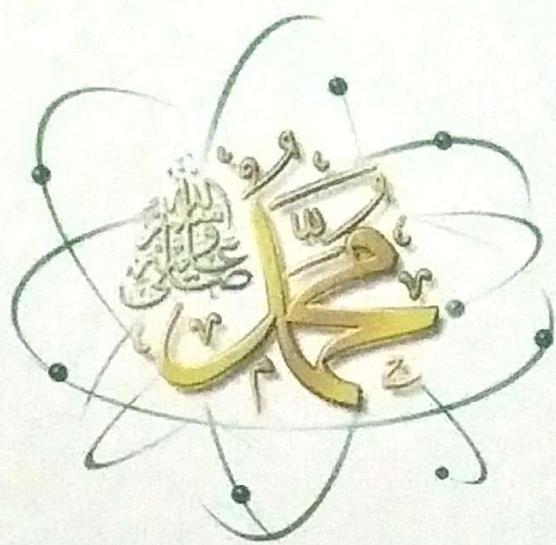
Muhammad

The World's Great Scientist



Dr. Winai Dahlan

The Halal Science Center Chulalongkorn University





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Muhammad: The World's Great Scientist

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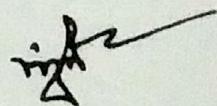
Foreword

Sheikhul Islam's Word

Islam, as it is known these days, reflects the teachings that Prophet Muhammad propagated over 1,400 years ago. It is a religion that consists of pillars of faith and practices according to the Holy Quran, part of which were explained by Muhammad to illustrate complete understanding about Islam. Believers of one generation to the next have practiced the religion, passing on the faith, as well as fostering the development of sciences and technology.

Muhammad was born during the time when Europeans states were mired in an intellectual void. The enlightenment he brought brightened the land of Arabia and the Muslim World thereafter. Not only that, innovations initiated by Muslims led to the awakening of Europe from darkness, bringing her to the Renaissance and extension of the knowledge base until she achieved prosperity in the next era. The benefaction of Muslims toward the world's Renaissance as well as the development of science and technology has been enormous and worth remembering. Part of this is mentioned in this book.

As Sheikhul Islam of Thailand and on behalf of the Central Islamic Committee of Thailand, I hereby congratulate Associate Professor Dr. Winai Dahlan, the President of the Central Mawlid of Thailand 1436 AH (2015), who completed the book, which brings pride of the Muslim World. In particular, the book portrays the great contribution to the development of Muhammad, the prophet Allah sent as mercy for humanity.



Aziz Pitakkhumphol

Sheikhul Islam of Thailand

Religious Teaching

Every religion has two major parts in common that unite them.

One is "faith" that is held steadfastly and linked directly to society and culture.

The other is "thought" that is guidance and reality.

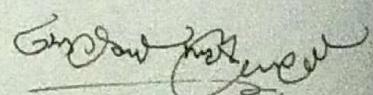
With creed and belief, the religion is faith.

Thought is the morality and heart of the religion.

It is also the wisdom that guides man through life.

Faith and wisdom must be held equally.

Knowing the core fundamentals and practices means knowing the religion.



Naowarat Phongpaiboon

President of the Reform Committee of Arts, Culture,
Morality and Religion.

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Muhammad: The World's Great Scientist

Dr. Winai Dahlan

Founder and Director of the Halal Science Center,

Chulalongkorn University

Vice President of the Central Islamic Committee of Thailand

President of the Halal Standard Institute of Thailand

Member of the National Reform Council

President of the Mawlidin Nabi Celebration of Thailand 1436 AH



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Introduction

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Introduction

The book you are now holding in your hands is titled Muhammad: The World's Greatest Scientist. The Grand Prophet of Islam is known for his expertise in religion, government, law, politics, military affairs, and trade. Moreover, he was also a great scientist. First, we need to clarify the meaning of science. The word "science" according to the globally recognized Oxford dictionary refers to the intellectual and practical activity encompassing the systematic study of the structure and behaviour of the physical and natural world through observation and experiment. As such, a "scientist" is a person who is studying or has expert knowledge of one or more of the natural or physical sciences. In accordance with these definitions, Muhammad dedicated his life to improving the underdeveloped Arab society using various means, as well as suggesting and applying technology that existed at that time until the society developed systematically and solidly succeeded in natural sciences such as irrigation, agriculture, and public health. These allowed Arab society to advance much further than its state during the beginning of Islam. Anyone would know that such advances were the results of Muhammad's efforts.

The Prophet's work was performed with rationale and reason, aiming for concrete results. Many of his explanations of the Quranic verses related to scientific knowledge, including biology, geology, astronomy, and mathematics. Modern scientists admit that both the Quran and hadith (reports of statements, actions or tactic approval of Muhammad) are surprisingly accurate after examinations and experiments. These tangible achievements proudly confirm that Prophet Muhammad was a true scientist. The knowledge he passed on and the legacy he left for the Muslim World were built upon and inspired many recognized globally Muslim astronomers, chemists, physicists, mathematicians, engineers and medical doctors. Thus, compared to other people during his time, it is not wrong to declare that Prophet Muhammad was the greatest scientist of the era.

Both Muslims and non-Muslims already know a lot about Prophet Muhammad. However, many people still do not know his stories in regards to scientific development and technology. Some Western scientists even say that had Muhammad not been born, science would not have been as advanced as it is today. Those who understand that Muhammad was a master of government, laws, business, military affairs and religion should also know that he was an expert in science. Indeed, he was a genuine polymath, considering the legacy he left behind in the Muslim World covering the basics of science and technology, which led to astonishing discoveries. These extensions were what brought the Muslim Society of the next era into prosperous civilization with enough potential to govern the world twice, and create arts and science which became the fundamentals today's flourish of science and technology. All of the aforementioned stories are written about in this book.

After recognizing Prophet Muhammad as the world's greatest scientist, the next step is to understand "Mawlidin Nabi 1436 AH" since this book's author had been entrusted with presiding over Mawlid Klang of Thailand 1436 AH. First of all, the phrase "Mawlidin Nabi" consists of two Arabic words meaning, "Birthday of the Prophet; and "AH" is an abbreviation of After Hegira. It refers to the Islamic calendar, commencing from the migration of Muhammad from Makkah to a city 320 kilometres to the North called Yathrib (present-day Madinah). The event took place on 16 July 16 622 A.D., which might make readers wonder why the number is 1436 instead of 1393, and where the addition 45 years came from.

The answer is that the Islamic year uses the lunar calendar, which has 354 days, 8 hours, 48 minutes and 33.6 seconds, whereas the Gregorian calendar is solar with 365 days, 5 hours, 48 minutes and 46 seconds. A year in the solar calendar has 10 days, 21 hours more than a year of the lunar calendar, and 32 months and 15 hours or roughly a month every three years. The regular lunar calendar systems used by Thais, Chinese and ancient Arabs are added months every three years to move seasons in line with the solar calendar. However, it is not allowed to add a month in the Islamic Hijri calendar, which makes it 32 and a half days faster every three years, or 359 days or roughly a year faster every 33 years. This means that 33 years of the Hijri calendar is equal to 32 years of the Western calendar.

Based on this calculation, 1,393 years of the Gregorian calendar is precisely equivalent to 1,436 years of the Hijri calendar.

Unlike other religions, Islam does not have a tradition of birthday celebrations with cakes and candles. The word mawlid means actual birthday, which everyone has only one time in their life. In contrast, a birthday anniversary celebrated by non-Muslims is a different word in the Arabic language, which is Milad or Eid Milad for birthday anniversary celebration. But Muslims in many countries have broken the original Islamic tradition of feasting for their beloved Prophet. As for Thai Muslims, their Mawlidin Nabi Celebration of Thailand, which is the largest Muslim fair in the country, does not fall on the Prophet's birthday, 12 Rabi al-Awwal; rather, it is organized annually on any convenient day. For instance, in the Mawlidin Nabi Celebration of Thailand 1436 AH itinerary, Prince Maha Vajiralongkorn, the Royal Son and Crown Prince of Thailand, was to appear on 8 March 2015 at the fair, which was held from 7-9 March 2015, falling on Jamad ul-Ula 16 – 18, the fifth month of the Islamic Hijri calendar, not 12 Rabi ul-Awwal, which is the 3rd month. Thus, it is not very correct to conclude that the Mawlidin Celebration of Thailand is to celebrate Prophet Muhammad's birthday. Instead, it is meant to recollect the countless benefits Prophet Muhammad left to this world.

Muhammad: The World's Greatest Scientist was written in remembrance of Prophet Muhammad for his contribution towards science and relevant fields of knowledge. This book is divided in two major parts including Part 1: His Influence on Development of Science and Technology, and Part 2: Influence toward Medication, Nutrition, and Halal. Both parts were written by myself, Assoc. Prof. Dr. Winai Dahlan. While composing this book, I was assigned with multiple positions simultaneously, including director of the Halal Science Center, Chulalongkorn University, Vice President of the Central Islamic Committee of Thailand, President of the Halal Standard Institute of Thailand, member of the National Reform Council (NRC), Deputy President of the Reform Committee of Arts, Culture, Morality and Religion, and Secretary of the Consumer Protection Reform Committee. These important posts led to the completion of this book and the Mawlidin Nabi Celebration of Thailand. Many people asked me how I managed my time to complete this book despite the workload. The answer was that Prophet Muhammad's miraculous stories

are always inspiring me. More importantly, when I studied his work that contributed to science, I got to learn numerous stories of the Prophet, which I never knew before, and thus wished to share the knowledge.

The contents of Part 1 were collected from chapters of the feature, "Muhammad's Influence On Science and Technology", published weekly in the Siamrath Weekly Review column where I submitted my research reports about Prophet Muhammad's stories in relation to the development of science and technology. The second part of this book was compiled from the article Muhammad's Influence On World's Medication and Nutrition, published weekly in the Smart Consumption column of Nation Sudsapda, where I submitted my research reports about Prophet Muhammad's stories in the context of medication and nutrition. Both parts have been generosity received by the two magazines and welcomed by readers. The preparation of both pieces of content began simultaneously in mid-September 2014 with a total of 42 chapters of 1 – 2 A4-page articles. After that, I started writing Part 3: Short Biography of Prophet Muhammad, subsequently adding Part 4: Development of Science and Technology in the Muslim World and Muslim Scientists in History and Part 5: Epilogue.

The purpose of this book is to illustrate how Prophet Muhammad influenced the development of scientific fields, including pure and applied sciences, technology, medication, nutrition and halal in the modern world. Information was collected via studies of books and various types of media. The method was similar to researching, starting by questioning about an important person who played a crucial role in the development of scientific works, although it is totally unexpected to many people, both Muslims and non-Muslims, that Prophet Muhammad would have had so much influence on science. Some scholars say had he not been born, today's world would probably be at the beginning of industrial development even though it is much more developed than the past. Prophet Muhammad was akin to an enzyme that accelerated the development of science and technology, making them what they are today. It is not a false statement to conclude that he is the world's greatest scientist, despite the fact that many people may never have expected it.

The research question led to the writing of this book. It portrays

that the Arab people in the Arabian Peninsula before the birth of Prophet Muhammad were uncivilized and underdeveloped, compared to the Persians, Byzantines, Egyptians and even Abyssinians in Africa. But after Muhammad came and spread Islam, only by accepting Islam the uncivilized community turned their society into a leading group of people who could govern and bring prosperity to the old civilization. Finally, old Muslims and new Muslims comprising various races of people were united and they built the great Islamic empires twice, along with creating arts and fields of science, which paved the way for modern sciences. The question is how all these happened, how Prophet Muhammad implemented so-called scientific methods, and what strategies and tactics he used to develop society at that time.

Generally, a research question needs to be answered. Thus, the contents of the book were acquired through a lot of research and analysis. The conclusion and gathering of the contents into this book are eagerly intended to give every a pleasant answer. This particular book is entirely the product of an academic study conducted by the author as an academic, researcher, educator and administrator in the past decades. With experience from those roles, I hope that this book will interest all readers with Prophet Muhammad's biography. The only difference is that I focus on the development of science, technology, medication, nutrition and halal. My approach is more scientific and social. Before compiling the content for printing, I had chances to give multiple lectures at many different places to present the stories of Prophet Muhammad and receive feedback to improve the book. A number of listeners indicated that they appreciated the new stories and became more proud of Prophet Muhammad. Also, they learned what they had never known before. These viewpoints truly encouraged me. The stories mentioned in this book started about 1,400 years ago when the Arabs in the Arabian Peninsula uplifted their civilization under the leadership of an illiterate man named Abu al-Kasim Muhammad son of Abdullah son of Abdul Muttalib son of Hashim. He is known by every Muslim as Prophet Muhammad and his stories are definitely a source of their common pride.

There are many people behind this success. First of all, I have to thank

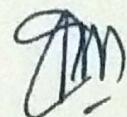
the Central Islamic Committee of Thailand, presidents of every Provincial Islamic Committee, and most importantly, Mr. Asis Pitakkhumphol, the Sheikhul Islam and President of the Central Islamic Committee of Thailand, and Pol. Maj. Gen. Surin Palare, the Secretary-General of the Central Islamic Committee of Thailand, who entrusted me with presiding over the Mawlidin Nabi Celebration of Thailand 1436 AH.

Because of this task, I was motivated to complete this book. I would like to extend my thanks to executives and officials of the Bureau of Budget, the Office of Higher Education Commission, and the Office of the National Economic and Social Development Board for constantly supporting the Halal Science Center, Chulalongkorn University, particularly by funding projects related to halal development in Thailand. Part of the budget was provided for the creation of this book to publicize halal work, which is a major purpose of my projects.

I am sincerely grateful for every support from Chulalongkorn University, and even more so from the President of Chulalongkorn University Council Professor Emeritus Dr. Khunying Suchada Keeranan, and Professor Dr. Phirom Kamolrattanakul, Rector of Chulalongkorn University and Directing President of the Halal Science Center. I would also like to express my gratitude toward the two aforementioned magazines that have given me an opportunity to publicize more than 3,000 articles throughout the last 20 years. Stories of Prophet Muhammad were published in both magazines for five months continuously. A group of people I would never forget to thank is that of my colleagues at the Halal Science Center, the Halal Standard Institute of Thailand, the Central Islamic Committee of Thailand and the Islamic Committee of Bangkok – who always provided me with help every time I needed it. My gratefulness would not be complete

without mentioning my fellow members of the National Reform Committee who contributed directly and indirectly to this success, especially Prof. Em. Dr. Thianchai Keeranan, my former boss at Chulalongkorn University, who, during his presidential tenure, assisted me greatly when I launched halal science at the Faculty of Allied Health Science, which led to the establishment of the Halal Science Center, the world's first halal science institute. In addition, there are a number of individuals as well as agencies that are not mentioned here that were directly and indirectly involved with the completion of this book, to which I would like to extend my heartfelt gratitude.

May Allah, the glorified and the exalted, grant them happiness and success in life.



Assoc. Prof. Dr. Winai Dahlan

February 13, 2015



Muhammad: The World's Great Scientist
Part 1: His Influence on the Development of
Science and Technology



Chapter 1

Mawlid

Among 68 million people in Thailand, Muslims are a minority comprising only 7 per cent of the entire population. More than a half of the Thai Muslims are found in the country's southernmost provinces, followed by the Mid-Southern Region, and Bangkok and the Metropolitan Region while the rest are scattered throughout the country. A number of Muslims settled in the Eastern Region and a few dwell in the Northeast. Most Thai Muslims belong to the Malay ethnic group; the rest include other ethnicities, including South Asians, Thais, Chinese, Indonesians, Khmers, and Arabs. They live peacefully in this country with other ethnic groups, although there are some conflicts in the three southernmost provinces of Pattani, Yala, and Narathiwat, which are more likely rooted in political, racial and historical issues, more so than religious ones.

Although the number of Muslims in Thailand is small, their harmony is explicit, given the frequent activities held by the population. Every year Thai Muslims, under the leadership of the Central Islamic Committee of Thailand that is chaired by the Sheikhl Islam, Provincial Islamic Committees, government agencies and the private sector, jointly organize a grand event by the name of the Mawlidin Nabi Celebration of Thailand. The event can be traced back to the reign of King Rama V. A significant change occurred in 1963 when King Bhumibol Adulyadej together with Queen Sirikit led the opening ceremony. Since then, the Mawlid Klang has become a symbolic event, representing the relationship between the chief of state and Muslim people. In recent years, His Majesty's representative Prince Vajiralongkorn has presided over the ceremony, which subsequently become a local tradition in the end.

The Mawlid Klang of Thailand is the largest Muslim event in the country. Recently, it has been organized at the National Administration Center for Islamic Affairs Chalerm Phrakiat, located on Khlong Kao Road, Khlong Sip, Nong Chok, Bangkok from January to March. The exact time of the event depends on the Ceremony President's schedule. In 2014, the Mawlid Klang was held during 20 to 23 March and in 2015, it was fixed on 7 to 9 March.

The Arabic word mawlid means birth, used only for Muslims. As for birthdays, in general, a common word for this is milad. This is because the general public celebrates their birthday anniversary, known as Eid Milad, which is not a popular practice among believers of Islam. Thus, the meaning of the word mawlid is the actual birthday that every Muslim has only once in their lifetime.

However, an exception is made in the case of the beloved Prophet Muhammad. Many Muslim nations impart much importance to the Prophet's birthday by proclaiming his birth, which is commonly known as Mawlidin Nabi. In Thailand, in addition to the Mawlid Klang, which is organized by the Central Islamic Committee of Thailand, there are many other Mawlidin Nabi celebrations arranged at different provinces as well as at over 4,000 mosques across the country. Like Mawlidin Nabi, which is recognized as an event to commemorate the Holy Prophet, the purpose of this book is to make people aware of what Prophet Muhammad did that contributed to the world's development.

A president of the Mawlid Klang of Thailand is chosen annually by nearly 70 members of the Central Islamic Committee and Provincial Islamic Committees. In 1436 AH, the selection was made on 9 September 2014, which resulted in an unexpected conclusion. The person entrusted with this honourable duty was Assoc. Prof. Dr. Winai Dahlan.

Muhammad

The World's Great Scientist

To publicize the word mawlid, which most Thais do not know of, I wrote this book, Muhammad: The World's Greatest Scientist to tell the stories that even more people, Thais and Muslims in Muslim countries alike, never knew. A number of Western scholars have stated that had Prophet Muhammad not been born, the Arabs would not have been able to build their own empire, science and technology development would not have occurred, the propagation of knowledge from the Muslim World during the Dark Age from the 8th to 15th Centuries would not have been seen, the Renaissance in Europe and America would not have arisen, the globe would have developed at a much slower rate, and today's world would still be in a dark age without the existence of modern advanced technology.

The systematic development of fields of science and technology, including astronomy, mathematics, chemistry, physics, biology, medicine and many others, was formed in the Muslim World in the 7th Century after the birth of Prophet Muhammad. Islam understands that the leadership of this man completely changed the uncivilized desert life of the Arabs to a civilization so advanced that it conquered the world twice, along with enhancing fields of knowledge including science and technology which later became major foundations of the world's development. Do you ever wonder how these things happened?

A pioneer of the modern economy, Adam Smith implied in History of Astronomy, which was published in 1869, that the development of science and technology requires an extensive constant harmony in a society and sufficient support from the government. Such a society is able to sprout seeds of science. In history, developed civilizations such as Egypt, Babylon, China, and India were advanced in fields of knowledge but theoretical or fundamental science developed from systematic thinking processes that were necessary for practical scientific and technological development was rarely found.

Adam Smith

When Islam emerged in the Arabian Peninsula, the society Muhammad rooted with systematic education development grew into a caliphate state that prospered to extended boundaries in Baghdad, with supreme leaders known as caliph, who succeeded the Prophet and governed the expanding Islamic state. Adam Smith continued to say that there was no doubt sciences were developed under the Islamic caliphate and became the basis of the subsequent generations' development. Such a development is the real contribution of the birth of Prophet Muhammad and represents the true meaning of the word Mawlidin Nabi proclaimed nowadays, which is obviously different from the typical birthday celebration.

Prof. Arthur J. Arberry of Oxford University wrote in *The Koran Interpreted*, published in 1964, that the person who contributed to changes in the world the most was Muhammad. Continuous development of science and technology is a consequence of the legacy of societal development Muhammad left behind. This is not an overstatement at all.

Muhammad
The World's Great Scientist





Chapter 2

Prophet Muhammad

About 1,500 years ago before the appearance of the man named Muhammad on earth, the lands surrounding the Arabian Peninsula were enriched with civilizations. To the northwest of the desert city of Makkah where Muhammad was born was ancient Egypt. This land was so prosperous for thousands of years before the Prophet's birth, it is recognized as the first human civilization.

In the time of Muhammad, Egypt had fallen into the hands of the Byzantine or Eastern Roman Empire but it maintained its prosperity. The Byzantines occupied lands from Egypt to Mesopotamia or Tigris-Euphrates Rivers, which had as affluent a past as the former civilization. The lands in the north of the Arabian Peninsula were under complete control of the Byzantine Empire.

About 1,400 to 1,500 years ago in the southwest of the Arabian Peninsula, there was the Kingdom of Axum. Caravans from the north of the Arabian Peninsula marched through the kingdom heading to Yamaniyah, which was located at the peninsula tail where the ancient city of Sabbaean was located, to cross the Red Sea and move toward the centre of the Axum Kingdom in Abyssinia, Africa. In the northeast was the ancient Persia in the Sassani Era, which had been wealthy from the past. It was a land that neither the Romans nor Byzantines could defeat. Surrounding the Arabian Peninsula were the lands of ancient civilizations called the Fertile Crescent. Strangely, only a few of those prosperous civilizations flowed into the peninsula.

Makkah 1,500 years ago was an old pass-way community that connected Sham or Syria and southern Yemen. What Makkah had to bring the community to prosperity was the Zum Zum Well, which never experienced a drought for over a thousand years. In the 21st Century, the well remains rich with water. A European engineer once surveyed the well, delving into the sand, and found that below the well, there were hundreds of sources of water flowing all the time.

Another advantage Makkah had was a square building located there widely known as Kaabah. It had been built long ago with tons of bricks. There were also numerous statues surrounding the Kaabah, placed and worshipped by believers of several superstitious faiths who went to pay respect every time they entered Makkah with camel caravans. This was a reason the city was frequently visited. Moreover, Makkah hosted a boisterous ritual to worship the statues every year-end.

Makkah's population consisted of a total of six Arab tribes. A good part of their culture was that they absolutely respected their leaders. Sometimes, they had quarrels with one another but somehow they could be reunited and continue to coexist. It was an occasionally loose social relation that could somehow be tightened. Unlike the unity of the northern civilizations, the unification among the Arab tribes was hard to achieve. The largest tribe in the Arabian Peninsula was Quraysh in which Muhammad was born.

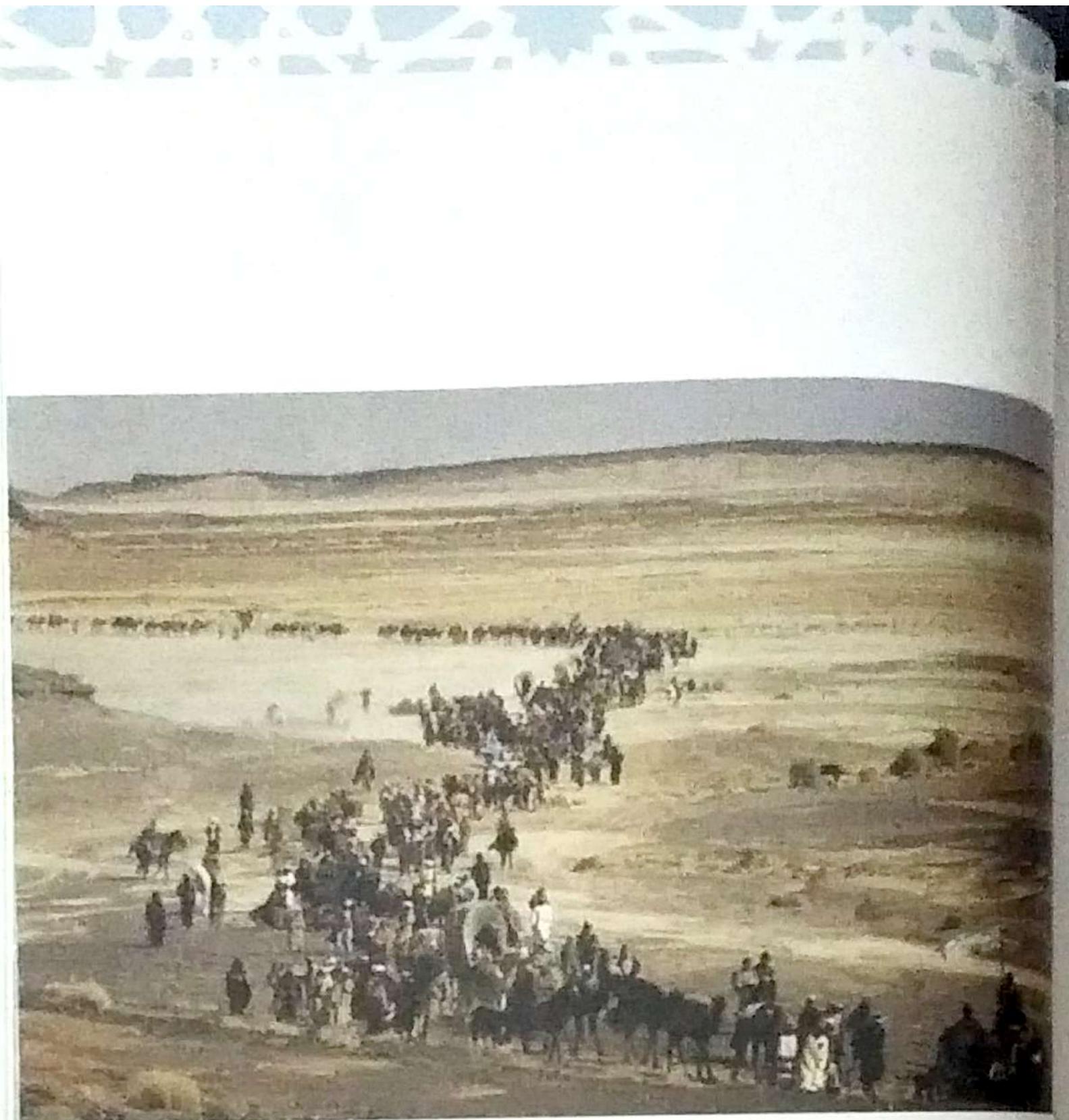
The birth of Muhammad took place in Makkah at about 4.30 a.m. on Monday, Rabi ul Awwal 12 in the year of Elephant, which fell on 22 April 571 A.D. Both of his parents belonged to the Quraysh tribe. Muhammad's father died when he was two months old in his mother's womb. He lived with his mother for six years before she passed away. After that, he was cared for by his grandfather for two years and was left orphaned again after his grandfather's demise.

After that, the person who took over the Prophet's care was his uncle Abu Talib, son of Abdul Muttalib, who travelled a lot because of his profession as a merchant. Muhammad helped his uncle with his trade from a young age, which kept him from studying, and this made him illiterate. Nonetheless, he was compensated with a decent personality, acuity, diligence, honesty and great morality. When he was 25 years old, Muhammad married a 40-year-old widowed merchant named Khadijah, daughter of Khuwaylid. They lived together for 25 years and had six daughters. When Muhammad turned 50, his 65-year-old wife Khadijah and uncle died. It was his saddest year and one of the most critical moments in his life.

Muhammad declared his prophethood in 610 A.D. at the age of 40. In every previous year in Ramadan, the ninth month of the lunar Arab calendar, he would observe fasting and go to Hira cave for several days. The small cave was on a mountain located about three kilometres northeast to Makkah. In the night of Monday, 22 August 610 A.D., Muhammad received the first revelation from Allah. The verse reads, "Read! In the Name of your Lord, Who has created (all that exists), Has created man from a clot". This was a prescript from God upon the man who could not read nor write named Muhammad, and he brought education to Arabia. As strange as it seemed, the illiterate prophet succeeded his mission.

Modern historians describe the Arab tribes in the Arabian Peninsula at that time as the jahiliyyah, which means ignorance of divine guidance. By their appearances, they were usually seen as unclean and with a dislike of showering, despite living in the desert. Arab women in that era were treated like slaves and they were undignified. Families that had too many daughters would bury them in the desert to keep their number under an acceptable amount. The Arab tribes at that time were obviously immoral and it was these people whom Muhammad was ordered to change.

After he received the first revelation, Muhammad started to propagate it to people close to him, to let them know of the coming of Islam and introduce them to worshiping one God, Allah. The first person to accept Islam was his own wife Khadijah, followed by the Prophet's relatives as well as friends. The mission went on slowly along with the occasional opposition. Interestingly, Muhammad used Islam to change the uncivilized Arabs to a high civilization that later on conquered the entire Arabian Peninsula and took over all the ancient empires. The world fell under the administration of the Muslims twice, where they brought about numerous scientific and technological advancements.



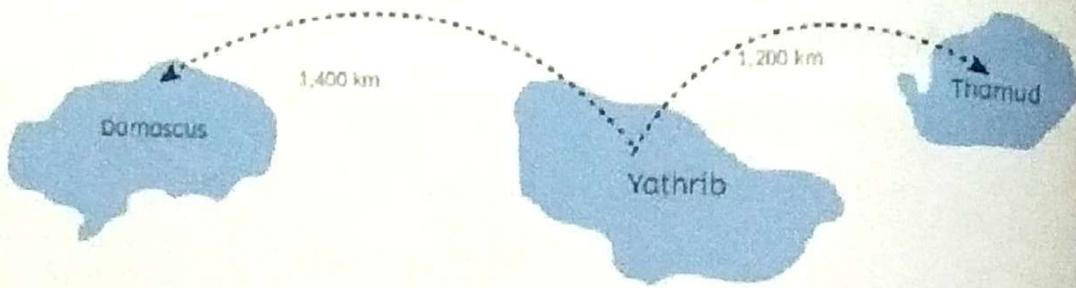
counterjihadreport.com

Chapter 3

The Migration

To examine what Muhammad did to uplift the barbarous Arab tribes to a community with such high potential, that it managed to conquer many highly civilized nations with long histories of prosperity such as those of the Middle East, Central Asia, North Africa and the Mediterranean, one has to look back at how the Arabs in the Arabian Peninsula used to live. One will subsequently be surprised and more curious of the strategies the Prophet implemented to completely change those people; this knowledge can be applied to improve one's own society.

Surrounding the Arab World before Muhammad's era were ancient Egypt, Mesopotamia and Persia, long known for their prosperity and highly advanced civilizations unlike any others. Numerous records and studies about such remarkable places have been conducted by scholars of many different fields. In contrast, information about the inner lands of the Arabian Peninsula remained virtually unknown due to the lack of organized records.



As mentioned above, the desert tribes of the Arabian Peninsula were inferior in term of civilization to all their surrounding nations. They were also much less educated although they had some limited advancements. Almost all of the records of their history were collected by archaeologists after Muhammad was born. The most amazing thing was that Arab scholars who recorded the history were descendants of mostly illiterate people from only a hundred years before. Indeed, it was these scholars who developed into a highly educated society not long after the Prophet's era.

In fact, the tribes of the Arabian Peninsula were not completely uncivilized but it appeared that most developments at that time were seen in the eastern communities of Dilmun and Thamud. They were located about 1,200 kilometres away from Makkah. Besides, the Sabaean was known to be another advanced community in addition to many other communities in the south, located about 1,150 kilometres from Makkah. In the north of the Arabian Peninsula or the Fertile Crescent, 1,400 kilometres from Makkah, there was a leading city called Damascus, whereas Makkah and Madinah at that time were known as Yathrib. It was located in western central Arabian where there were only desert lands and limited prosperity.

Despite the population density in the western cities of the Arabian Peninsula in Muhammad's era, there was no information about the people. In 2014, it was revealed that there were 52 million Arab people living in the peninsula covering six countries, excluding Jordan, Syria and Lebanon. If added to the number of foreign workers and migrants, the population increased to 78 million people. Nonetheless, nobody knows how many people were in the peninsula about 1,400 years ago.

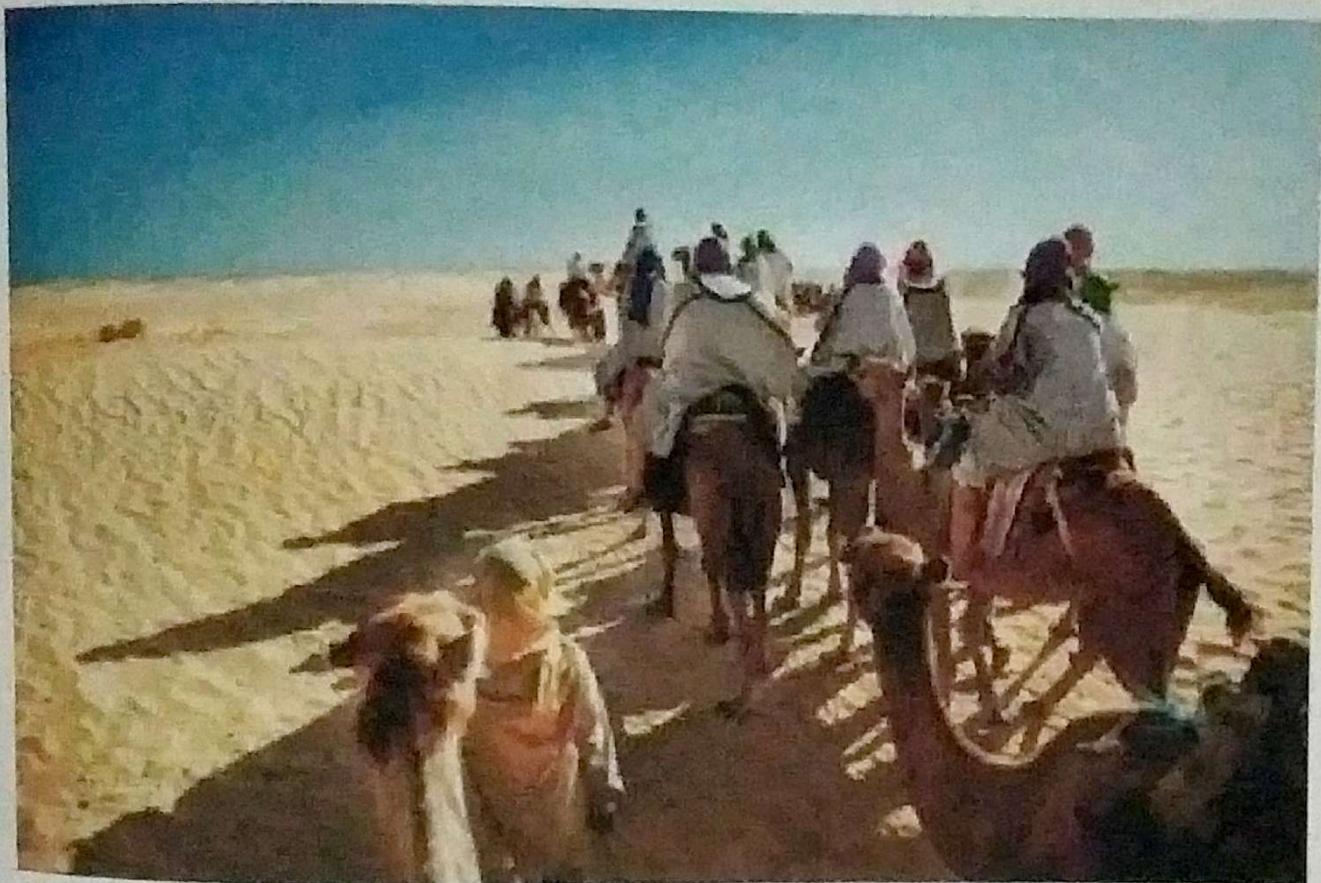
According to history, the population size was based on the number of soldiers involved in battles between Makkah and Madinah, which were located approximately 320 kilometres from each other during 623 to 632 A.D.; the two sides could gather only a total of 10,000 people when the war was at its peak. This showed that the settlement of the Arab people in the western Arabian Peninsula was more likely sporadic, with less than 200,000 residents in total, and that there were no large cities like the ones found in the northern area.

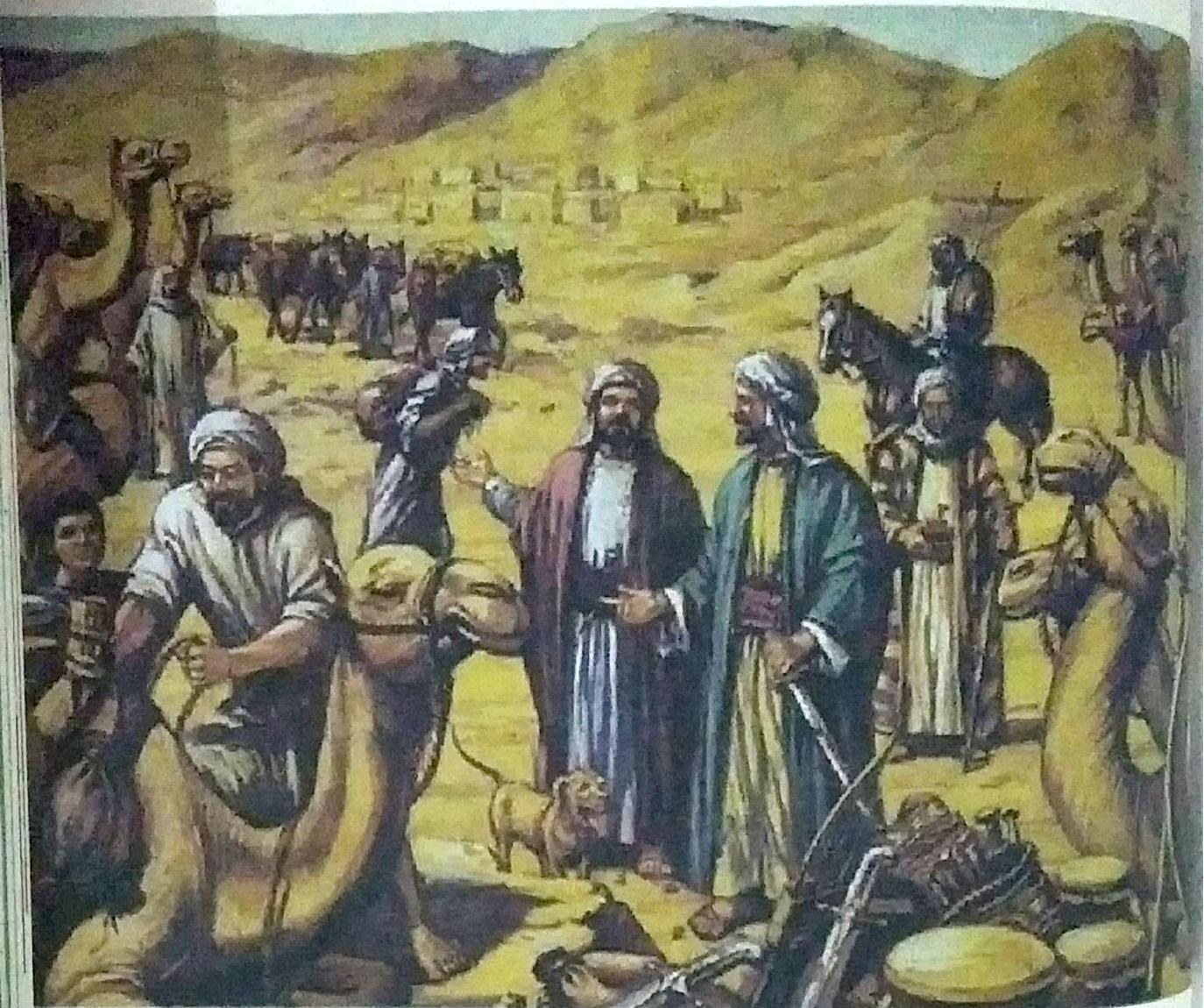
Regarding religions of the Arabs in western Arabia, there were believers of monotheist faiths such as Orthodox or Catholic Christianity, Judaism and Zoroastrianism, as well as various polytheist faiths. Before the birth of Muhammad, the Kaabah was surrounded by numerous statues, which pointed out that there more followers of polytheism than those of monotheism. In particular, the Quraysh tribe included many members who worshiped multiple gods.

During the dawn of the call to worshiping one God from 610 to 615 A.D., Muhammad did not find much opposition. First of all, it was because of the respect he earned from the people in Makkah. Second, the people in the city tolerated believers of other faiths.

But when the message of Islam spread, many groups, especially those who profited from worshipers of idols surrounding the Kaabah, threatened, assaulted, tortured or even killed newly converted Muslims. As a result, some of them were forced to move to the south. Some ventured to the north, and even Muhammad had to migrate in 622 A.D. The migration was known as the Hijrah and it declared by second caliph Umar Ibn al-Khattab as the beginning of the Islamic calendar.

Muhammad was welcomed by a city called Yathrib, which later changed its name to Madinah Al Munawarah, meaning "the magnificent city". It was known to some as Madinah Al Nabawi, meaning "City of the Prophet", and it was called in short Madinah (or Medina). Unlike people in Makkah, a number of residents of Madinah believed in one God. In the north of Madinah, most people were monotheists, including Christians, Jews and Zoroastrians. This was a reason why the spread of Islam in the latter part of Muhammad's era in the northern areas, which were governed by the Byzantine Empire, grew quickly. Moreover, the religion was brought into the Persian Empire, which comprised mostly Zoroastrians, without resistance or objection. It was the ancient monotheist northern empire that became the major base to spread Islam throughout the Middle East, North Africa and Central Asia.





Chapter 4

Leadership

In the time prior to the birth of Prophet Muhammad, the Arabian Peninsula was covered by deserts and inactive volcanoes. Only some areas were fertile enough for cultivation. How it appears today is also what it looked like 1,400 years ago.

The remoteness of the landscape was a major factor that determined how the people lived in that area. The Arab people at that time created their cultures also from the underdevelopment by settling together as tribes, bonded by kinship. People of different tribes were also linked by what they had in common. In the west of the Arabian Peninsula, although largely barren, there were some oasis areas in the middle of the desert, which nurtured large communities. The largest communities in that era were in Makkah and Madinah.

Arab tribes that settled in the two large cities and small towns, as well as those living in outer areas could be divided into two major groups, including permanent settlers who made a living by cultivating plants, raising animals or trading; and nomadic tribes conducting trade by caravans. Among the nomads, there was another group that earned a living by robbing other passing caravans. This was not regarded as a crime. Some of the vagrant tribes lived inside the cities, while some outside. Muhammad's clan consisted of both members who settled in the city and caravan merchants. One of the clan members was the Prophet's uncle Abu Talib who took him along on journeys of thousands of kilometres to the north, such as to Damascus and many other cities.

It is not easy to describe the faiths of the clan members. Living in Makkah, where the Kaabah was located surrounding by 360 statues, the Quraysh tribe included both people who believed in one God as well as those who worshiped local idols. However, a number of histories believed that Muhammad before his declaration of prophethood was among those who followed a monotheist faith called Hanif or Hunafa. They believed in one God, Allah. Some historians believed that Hanif was a branch of Christianity called Nestorian. This sect was regarded as conservative Christianity. This might explain how Muhammad learned about previous prophets, despite being illiterate.

At the age of eight, Muhammad, after losing his beloved grandfather, moved to live with his uncle Abu Talib bin Abdul Matatalib, helping him take care of livestock and merchandise. When he was 13 years old, the young Muhammad had chances to travel together with his uncle's caravan to civilized northern lands. He was able to see the great market in Damascus where goods from Europe and Asia were transported. These experiences allowed him to learn a lot about the world. When he turned 25, he married 40-year-old widowed Khadijah who owned merchandise caravans. Fifteen years later, Muhammad was bestowed the first revelation from God.

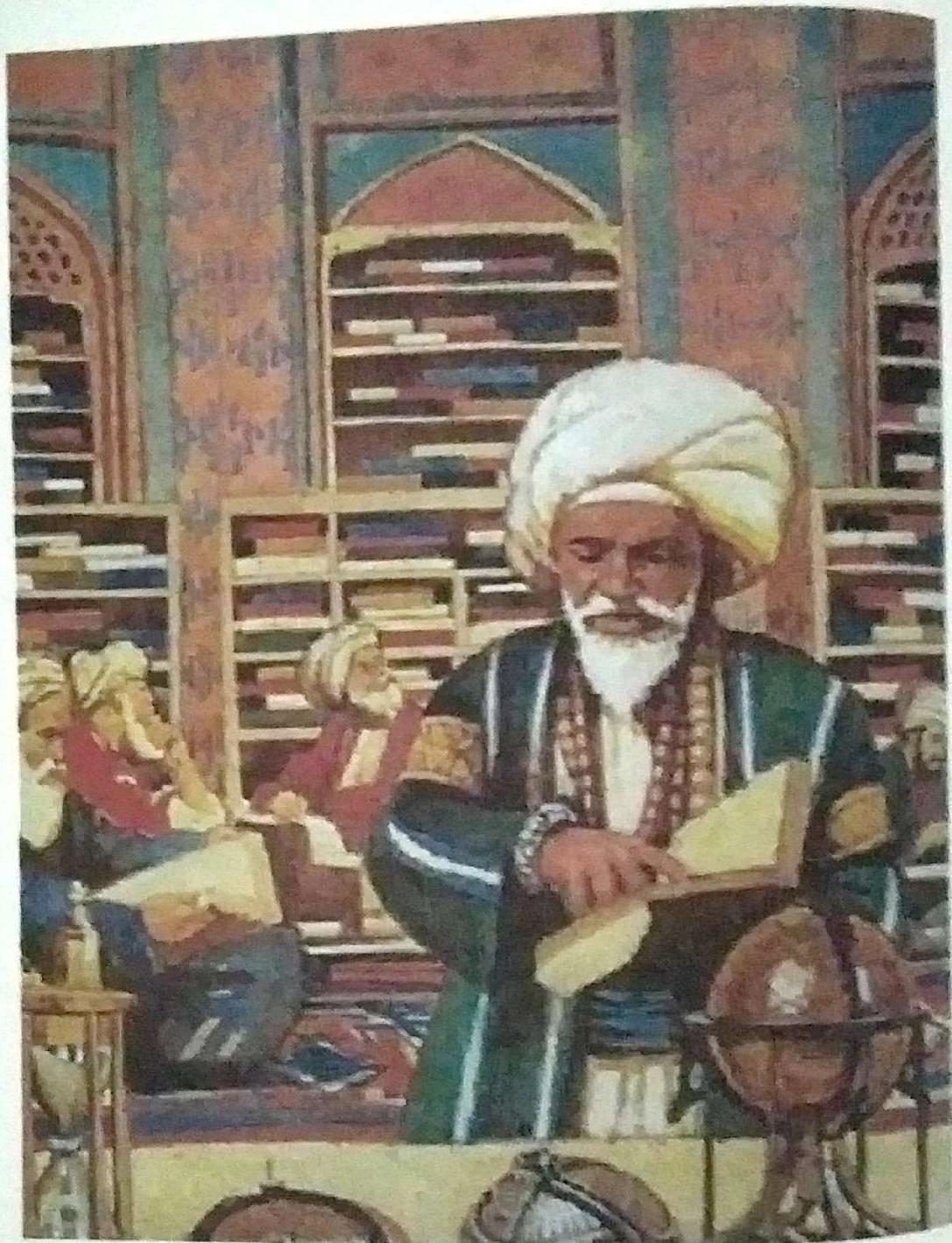
After three years of secretly spreading Islam, Prophet Muhammad began to make the religion known to the people of Makkah. Although he faced obstacles in later years, he was shielded by the influence of his uncle and wife. Nonetheless, resistance against him grew so strong that he had to advise some believers to migrate to the south. The year 619 A.D. was the year of tragedy for the Prophet because he lost both his uncle and wife simultaneously. As a result of their deaths, the Prophet's clan, the Banu Hashim, which belonged in the Quraysh tribe, took this opportunity to not only abort his protection but also stirred resistance. Tolerating the opposition for three years, Muhammad finally migrated to Yathrib where more people accepted Islam.

A decade later, despite enraging battles going on between Makkah and Madinah, Islam continued to grow unabatedly, and this generated diversity among tribes by ideologies and faiths. The growth of Islam led to the founding of the Islamic state based in Madinah with Prophet Muhammad as the emir or leader. He governed the empire using the Quran as the constitution with distinctive population, territory and sovereignty. The complete Islamic Empire was the very first to unite Arab tribes as a state.

During the reign of the Umayyad Dynasty, the caliphate expanded toward Europe to conquer Hispania or Spain and managed to build a great empire there. This particular empire was loyal to the Damascus-based Umayyad Caliphate. However, after the collapse of the central caliphate in Damascus, the Umayyad Empire in Spain established itself an independent state until 1614 A.D., where Muslims were ousted completely. During 756 to 1258 A.D., the Islamic Empire had two central authorities: one in Baghdad and the other in Spain. Even though Baghdad was destroyed in 1258 A.D., the Abbasid Dynasty continued to maintain its power in Egypt and established a small state there until 1517 A.D., whereas the authority was transferred from Arabs to Turk Muslims who established the Ottoman Empire, which saw the rise of Islam once again and lasted for centuries before its end in 1924 A.D.

Underdeveloped Arab tribes were turned into an Arab people whose empire covered more than half of the globe for hundreds of years, bringing high civilization to many other ethnic groups, including Moors, Turks, Indians and even Mongolians who later accepted Islam and helped build many empires in Central Asia. The Abbasid Dynasty also brought development and enhancement to the sciences and technology, which became the foundations of modern day sciences. It is believable that all of these advancements stemmed from one single person.

Muhammad



Chapter 5 Advancement

Many modern day Thai textbooks are duplicated from books written by past Western authors of Portuguese, Dutch, English, French, Russian and American heritage. The reason behind this was because most Thai records were destroyed and lost after the second collapse of Ayutthaya in 1767 A.D. Thus, the history of Ayutthaya and what happened before that could be found only in the Westerners' archives. However, there were both well-written records and unfortunately, those reported with prejudice.

The same thing happened to the Muslim World. An immeasurable amount of information was destroyed, along with the collapse of Baghdad on February 10, 1258, by the Mongolian army under the leadership of Hulagu Khan, a grandfather of the legendary Genghis Khan. It was said that almost all of the hundreds of thousands of residents were destroyed together with the city. The attackers completely demolished the great library, observatory, palaces, buildings and houses. The result of the destruction and loss was far greater than Burma's invasion on Ayutthaya.

But fortunately, some parts of the Abbasid Caliphate were left untouched in Egypt. Besides, many Arab books had been translated into Latin and dissipated in Europe. The bad point was that the records made by Europeans were filled with prejudice from the prolonged war between European Crusaders and Muslim armies. A speech by Prince Charles of Wales, the crown prince of Great Britain made at Oxford University on 27 October 1993, pointed out the prejudice very clearly. He said,

"One of the things the Western World did wrong to Islam is their refusal to admit that the modern Western civilization owes much to the Muslim World. This is a failure in education, which remains with us Westerners today."

In fact, post-Dark Age Europeans brought in technological advancements for further enhancement without giving credit to the glory days of the Arab World. Thus, Muslim scholars in later generations had to research for themselves, resulting in correct and incorrect information. However, there is one thing that always keeps even Western scholars curious. It is the question of how the Islamic Caliphates possibly took less than a century to change an uncivilized race to a model community that led with an abundance of scientific and technological development afterward.

Regarding this, Thomas Suddendorf, a professor of psychology at Queensland University, Australia, proposes his theory in *The Gap: The Science of What Separates Us from Other Animals*, published in 2013, that there are two things that make humans in any society cleverer than other animals: the eagerness to exchange information with others and the attempt to collect information from others to make it beneficial for themselves and their groups. The result is collective consciousness, which creates the culture of seeking knowledge, fostering development and creating civilizations. This theory describes very well how the Arabs in Muhammad's era built collective consciousness to the point that exceeded everyone's expectations.

As mentioned earlier, Adam Smith, the pioneer of modern economic science, wrote in his book that the Muslim society in Umayyad and Abbasid caliphates remained peaceful for a long time. The governments supported the people's learning and the results were educational institutes, schools of thought, learning centres, libraries, towers of wisdom and observatories. People could exchange knowledge among themselves and extend it to developing the basics of science, allowing the Muslim World at that time to build foundations for future sciences and technology.

Anybody who studies astronomy or mathematics knows who Nicolaus Copernicus was but they may not recognize the names of Al Albattani and Al Khwarizmi who were both born six centuries before him. In particular, the latter formulated Algebra and Arithmetic, which was said to be used to make manual calculations for the angles or degrees that finally brought Apollo 13 back to Earth, after it was floating in the space due to a power system failure, in 1970. And part of this calculation was a formula that had been developed by a Muslim scientist over a thousand years ago.

Modern medical doctors may know the pioneer of medicine to be William Harvey and have seen his written documentation of the systematic circulation of blood between the lungs and heart in the 17th Century. However, you will be surprised to see the exact same system explained by Ibn Al Nafis in the 13th Century. Besides, there were many other medical books composed by a Persian Muslim called Ibn Sina or Avicenna, which were used widely as textbooks in Europe.

In the late 17th Century, people were stunned by Sir Isaac Newton's question that led to the great physics theory regarding gravity. The question asked was why an apple fell to the ground but not float up in the air. Those people would have been astonished had they known that in the 10th Century, a Muslim scientist named Al Farghani had answered this question that an object of gigantic size would create gravity to suck in smaller objects. This implied that if Newton's apple was much larger than Earth, it would be Earth that gravitated toward the apple.

There were many other fields of knowledge that were developed by Arabs and Muslims long before Europe even knew of them. It is unfortunate that the Europeans forgot to refer the knowledge back to them. Though feeling regretful of this, the Prince of Wales said that it could still be resolved. His Highness maintains his positive thinking, and it would be good if we do the same.





Chapter 6

A'qabah

As mentioned earlier, humans' eagerness to share information with others and their attempts to collect useful information from others allow them to build collective consciousness to found a civilization. The most explicit example in this case was the people of the city of Yathrib or Madinah. They loved asking questions and sharing knowledge. Such qualities were part of factors that made them successful in Islamic history.

Yathrib was an oasis town amid the desert. It was located about 320 kilometres north of Makkah. This ancient city had a dense Jewish population. Also, many Bedouin Arab tribes lived there. Thus, most of Yathrib's population believed in one God but there were also polytheist believers. The Jews were the most influential group in this town. Until Muhammad's time, there had constantly been quarrels between the Jews and Arabs, which led to several small-scale battles. Therefore, Yathrib was covered by constant tension before Muhammad reorganized it in 622 A.D. However, in terms of education, this city had higher quality education than Makkah because it received more exposure to the northern civilizations.

The beginning of the mission to spread Islam was extremely difficult, even for Muhammad. It took him almost 10 years to convert only 170 people. In 619 A.D., it was the year of tragedy for him because he lost both his wife and uncle who always provided him with protection. His calling to Islam then became even harder. Also, Muhammad had to introduce the religion of Islam to nearby towns, including Ta'if, which was located about 100 kilometres to the west. The result was a failure, followed by violent incidents. Nonetheless, his success in dissipating Islam occurred in Yathrib with townspeople who worshiped several gods. This group of people would visit the Kaabah in Dhul Hijjah or the last month of the year of the Arab lunar calendar, and it was also these people who created a difference.

Regardless of faiths or beliefs, the people of Yathrib had one thing in common, which were truth-seeking personalities. During the introducing of Islam in Makkah, idol worshipers would celebrate the Tashreeq Day from 11-13 Zul Hijjah. They would gather at Aqabah, a small mountain located not very far to the north of the town (it is part of modern day Mina Field).

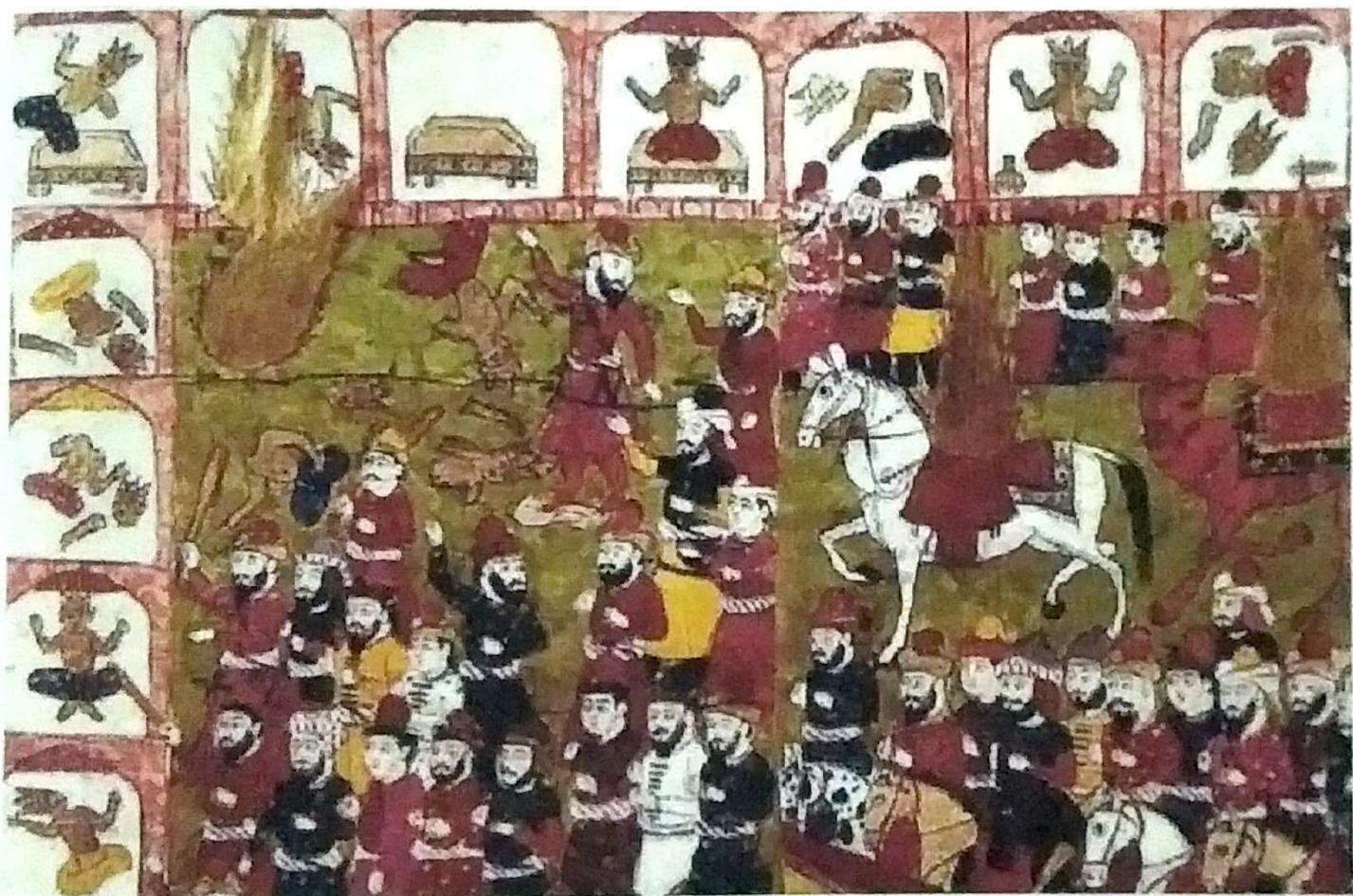
From the year 619 A.D., very often did the idolaters see Muhammad appearing in the area trying to introduce them to Allah and convince them to worship Him alone. With their truth-seeking, thoughtful and analytical character, the people of Yathrib passed on Muhammad's message to their fellow townsmen who did not go to the pilgrimage.

In 620 A.D. in the month of pilgrimage, six Yathrib residents came to Muhammad at the mountain of Al Aqabah to ask to convert to Islam. A year later, 12 people from the city, five of whom were the six that had met him a year ago, asked to make a pledge with Muhammad, which was known as the First Pledge at Al Aqabah, vowing that they would worship only one God. In the month of pilgrimage in 622 A.D., 75 Yathrib townspeople, including 73 men and two women, went to see the Prophet to take the Second Pledge at Al Aqabah, promising that the people of Yathrib would provide help and support for him and people from Makkah who believed in the religion of Islam if they migrated to the city.

On Safar 26, the second month in the Arab lunar calendar that fell on 16 July 622 A.D. or two months of the second Al Aqabah pledge, Muhammad along with his best companion Abu Bakr Ibn Abi Kuahfah decided to migrate from Makkah to Yathrib. The Hijrah or migration was the starting point of the Islamic era. Within two months, every Muslim in Makkah moved to Yathrib or Madinah. This migration was a major turning point in Islamic history, which even involved elite Muslims, and it was the crucial phenomenon that allowed Islam to build a solid, secure base.

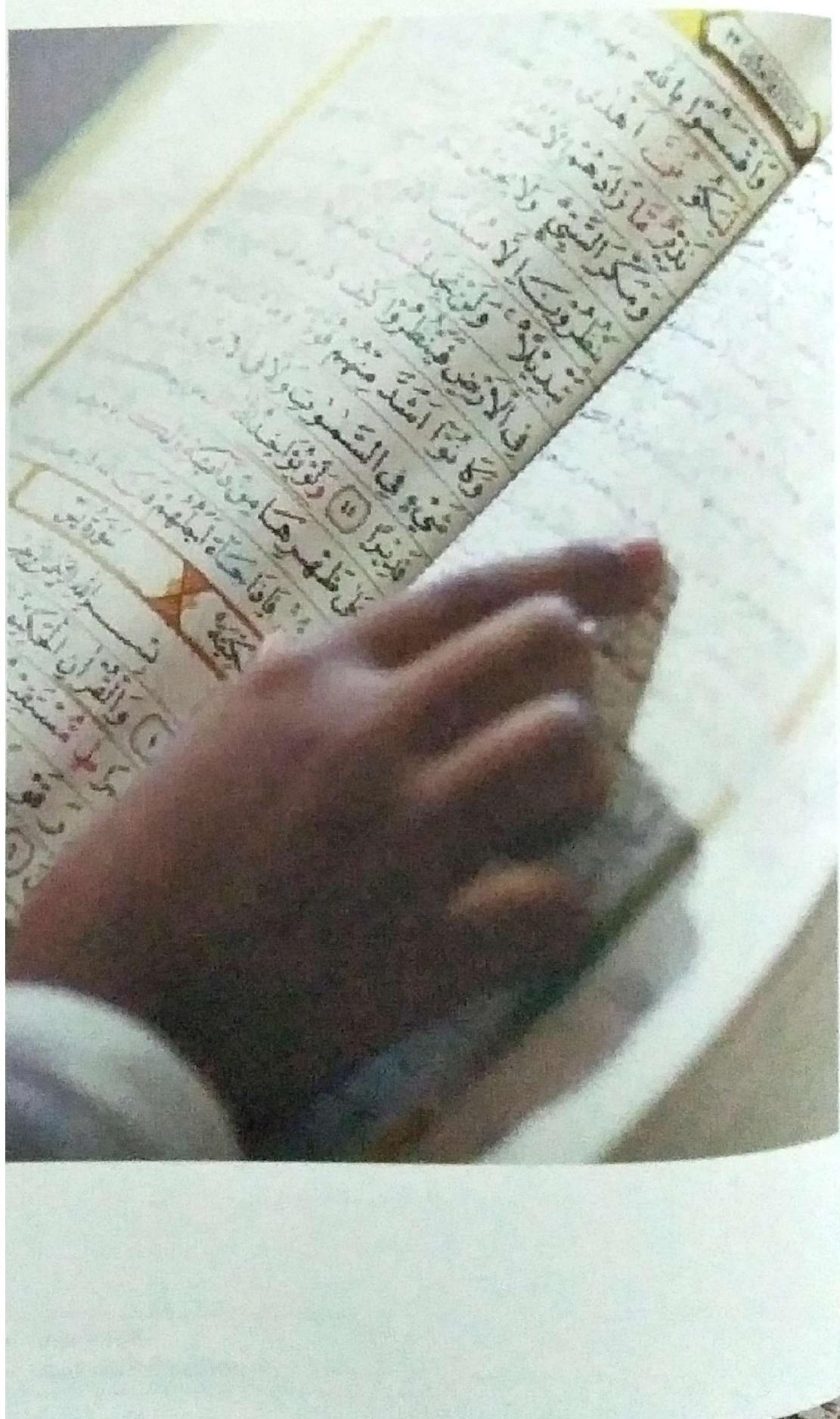
Based on the idea of collective consciousness proposed by Professor Suddendorf of Queensland University, curiosity gradually changed the people of Yathrib, including those who believed in one God and those who worship many gods, which led them to accept Islam, the only religion acknowledged by Allah. This was mostly due to their character. Yathrib townspeople who went to perform the pilgrimage in Makkah had opportunities to exchange opinions with Muhammad at the mount of Al-Aqabah, allowing them to crystallize their knowledge, and some of them eventually changed their faith to the religion propagated by the last prophet.

Such curiosity, which created collective consciousness, pliability and customary obedience to their leaders, induced a number of people in the Arabian Peninsula to convert to the faith new to them. This also changed the people of both Madinah and Makkah in term of civilization. This was because Islam emphasizes belief, hygiene, health and education, as well as business and well-being without taking advantage of others. Besides, the religion uplifted the Arabs to becoming developers of the fundamentals of science and technology, which were improved into advanced technological inventions seen nowadays.



Muhammad
The World's Great Scientist

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Chapter 7

The Holy Quran

I have to be very grateful to Allah for the opportunity to study at Universite Libre de Bruxelles, Belgium. In the 1980s, Prof. Dr. Yvon A. Carpentier, my Belgian boss, hired Dr. David Elwin, an outstanding medical researcher from Columbia University, New York, to work at a Brussels laboratory. Although it cost a fortune to hire the researcher, my boss said it was worthwhile because scientists who worked at the lab could ask him for advice. As it turned out, I was the one who had the most chances to talk to Dr. Elwin, which allowed me to learn the way he thought as well as a lot of scientific processes and methods. With that knowledge, I could almost see things through, and this has become a major tool in my line of work until today.

Prof. Dr. Elwin taught me that science is an extension of other people's findings. It is like a dwarf sitting on a giant's shoulder. It was said in Latin that "nanos gigantum humeris insidentes" – "the bigger the giant, the more advantageous the position on its shoulder becomes and the farther he can see". More importantly, the dwarf has to make himself grow bigger so that other dwarfs can step up on his shoulders, as well. In other words, a scientist is obliged to accomplish work for other scientists to extend or cite.

Obviously, every scientist learns from others and every scientific rule complies with Islam. To be precise, every rule in the world is in accordance with the religion of Islam.

Allah has prescribed the rule of Al Qadha wa'qadar and scientists have found secrets within it. They also extend their knowledge with the environment as the major factor of their success. In other words, support from policymakers or governments to create an appropriate environment in a society or agency to urge people's enthusiasm to seek knowledge is crucial toward the development of science. Also, a culture that supports reason-based discussions or arguments without holding grudges against one another turns out to be an essential process in developing an intellectual society.

Personally, I believe what I was told. For example, a society that dislikes creative questions usually lacks collective consciousness and knowledge management. Its people do not share knowledge with one another and it is very rare that there will be an excellent scientist among them. This is a reason why universities in the United States emphasize building an academic environment, while their scientists love to have conferences. When scientists of various fields and origins are put to work together, they have a chance to learn from one another's experiences and thus have more chances to develop their work.

There is no difference in the way of thinking and doing between the present-day United States and other Western countries and the Arab World 1,400 years ago. Westerners began by building discipline and developing the majority of their people to respect and follow rules. In the United States, regardless of the origins or races of the populace, the nation continues to grow because those new populations are taught to follow rules that are already secure under an environment that urges them to do so. While Western countries use laws to determine their direction, the Muslim world at that time clung onto the benefit of the majority. There is no difference between the two systems.

When Prophet Muhammad rebuilt the Arab World, he used Islam to nurture the people, teaching them about hygiene, sanitation and balance in society, and not to take advantage of others. Muslims learn rules from religious teachings such as social etiquette, leadership, and obedience to leaders through prayers, sacrifice, sympathy, tolerance through observing fasting, sharing, fair society through zakat charity (a form of obligatory charity and religious tax), harmony, equality and how to build a multiracial community through building the nation and the hajj pilgrimage. Apparently, teaching in Islam is done through practical demonstration.

The process of learning the teachings, which were jointly recorded, memorized, discussed and consulted, and of decision making based on the leader throughout 23 years of Muhammad's hard work, completely changed and softened the hearts of the Arabs tribes, inducing them to acknowledge and honour others' knowledge and experiences. In the beginning era of Islam, the believers brought in technology from surrounding civilizations, including Byzantine, Persia, China and India, and made their own technological extensions such as the development of agricultural and irrigation systems, government, law and business. Muhammad's strategy to convert other nations under his governance to Islam without turning them into Arabs only won the hearts of non-Arab people to accept the monotheist faith.

As a result of the teachings, which changed the Arabs to accepting and respecting others' knowledge and experience, the Muslim community in the Salaf Al Salih, or the first three centuries after Prophet Muhammad's death, included Persians, Central Asians, Turks, Caucasians and Africans who were involved in developing several fields of science, which later became the foundations of modern sciences, including Mathematics, Algebra, Geometry, Trigonometry, Chemistry, Biology, Physics and Astronomy. These were clear examples of building an intellectual community through the collections of the Holy Quran and hadith following the death of Muhammad in 632 A.D.

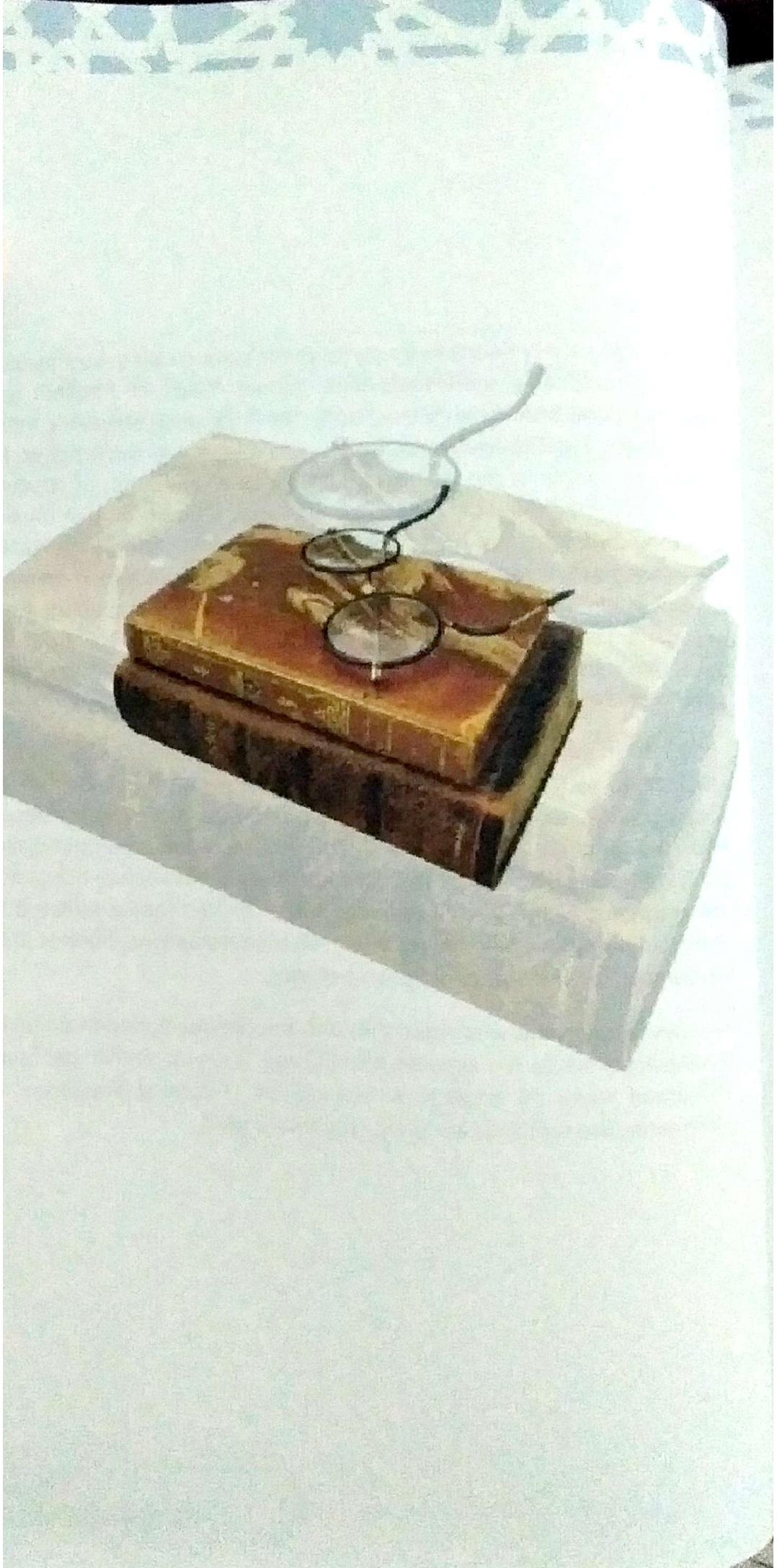
Muhammad

Muhammad
The World's Great Scientist

The Arab society developed a consultative system called mushawarah in Arabic, comprising individuals with various fields of intellect and experiences based on Islamic teachings. The final decisions were made by the leader, Prophet Muhammad. This was a legacy of the Prophet. He uplifted the people in the Arabian Peninsula to a civilization of wisdom. After Muhammad's death, caliphs or supreme leaders of the Muslim state consulted other leading figures about the collection of the verses of the Quran caliphs or Holy Book, which were initially recorded on many different materials such palm leaves, leather, wood plates, papers, rocks and others. The consultation resulted in the conclusion to collect all the verses into mushaf or a book, adjusting many different forms of writing and pronunciation into one standard.

As for hadith, it is the collection of sunnah or traditions of Prophet Muhammad, including his words, opinions and interpretations of the Quran, daily life, acceptance, refusal, travel and every action for Muslims to follow, in addition to the Holy Book. These were recorded simultaneously as the Quran. Conferences, reason-based arguments, intellectual discussions and obedience to the leader were the major factors that stimulated the Arabs to develop at a rapid pace, which led them to become leaders of the development of sciences mentioned before.

Over a thousand years ago, the Arab people developed their society outstandingly while the present-day Europe is using similar processes. If Thailand wants to improve its society by reforming processes, the aforementioned methods are highly recommended.



Chapter 8

Hadith

Regardless of the era, social development begins with the development of human resources. There was no difference for the Arab World 14 centuries ago in this regard. The development began after the appearance of Prophet Muhammad and his introduction of Islam with the Quran as the main mechanism. The Prophet spent 23 years spreading Islam, including 13 years in Makkah and 10 years in Madinah after the migration. The Prophet could neither read nor write, so he passed on the verses of the Quran that was bestowed upon him by God, to his followers at many different times and on various occasions. Hearing the verses of God from Muhammad, his followers memorized, recorded or wrote them down on different materials such as papers, leather, wood plates, rock plates, date branches, bones, earth and many other substances.

To combine the verses of the Quran, Muhammad decided to impose surah or chapter and ayat or verses, ordering his followers to compile scattering verses from reciters as well as those written on many different materials into one place. As a result, the Quran was gathered into distinct chapters and verses. It was the preface of the development of the barbarous Arab tribes into a highly civilized state, which managed to create the foundations of modern science and technology.

After Muhammad passed away, the first person to succeed him was Abu Bakr. He initiated the combination of the Quran upon the suggestion of Umar Ibn Al Khattab, the second caliph who continued the work efficiently. However, it was the third caliph, Usman Ibn Affan, who turned out to be the main catalyst that combined the verses of the Quran, which were written at many different places in many different forms of writing and pronunciation during Umar's reign. Caliph Usman incorporated those different versions of the book into one mushaf based on the Quraysh tribe's writing and pronunciation, which has been in use until this day.

Following the Quran, hadith are the second most divine source of Islamic teachings. Thus, traditions of Prophet Muhammad were compiled into books of Hadith. They contain reports of Prophet Muhammad's sayings, deeds and acceptances, which are also known as sunnah or tradition. Hadith are divided into series and classes for the ease of searching. What was recorded as hadith happened when the Prophet was alive. Many of his followers asked to learn the Quran from him and recorded his deeds. When they had what they wanted, they travelled back to their hometowns. This was why recorded and memorized reports of hadith are scattered in many different places.

Most of the Quran collection processes were done by the state but there were some people who collected the Holy Book individually. On the other hand, Muhammad's followers largely gathered the hadith while only a smart part was done by the state. Thus, seeking Hadith was an interesting part in Islamic history. Some of the hadith were memorized by only one follower of the Prophet and to make things worse, he moved to somewhere distant. If any other followers would like to learn the hadith, they had to travel for months to meet and learn from the only ones who memorized them. This intellectual awareness was the thing that gradually civilized Arab society.

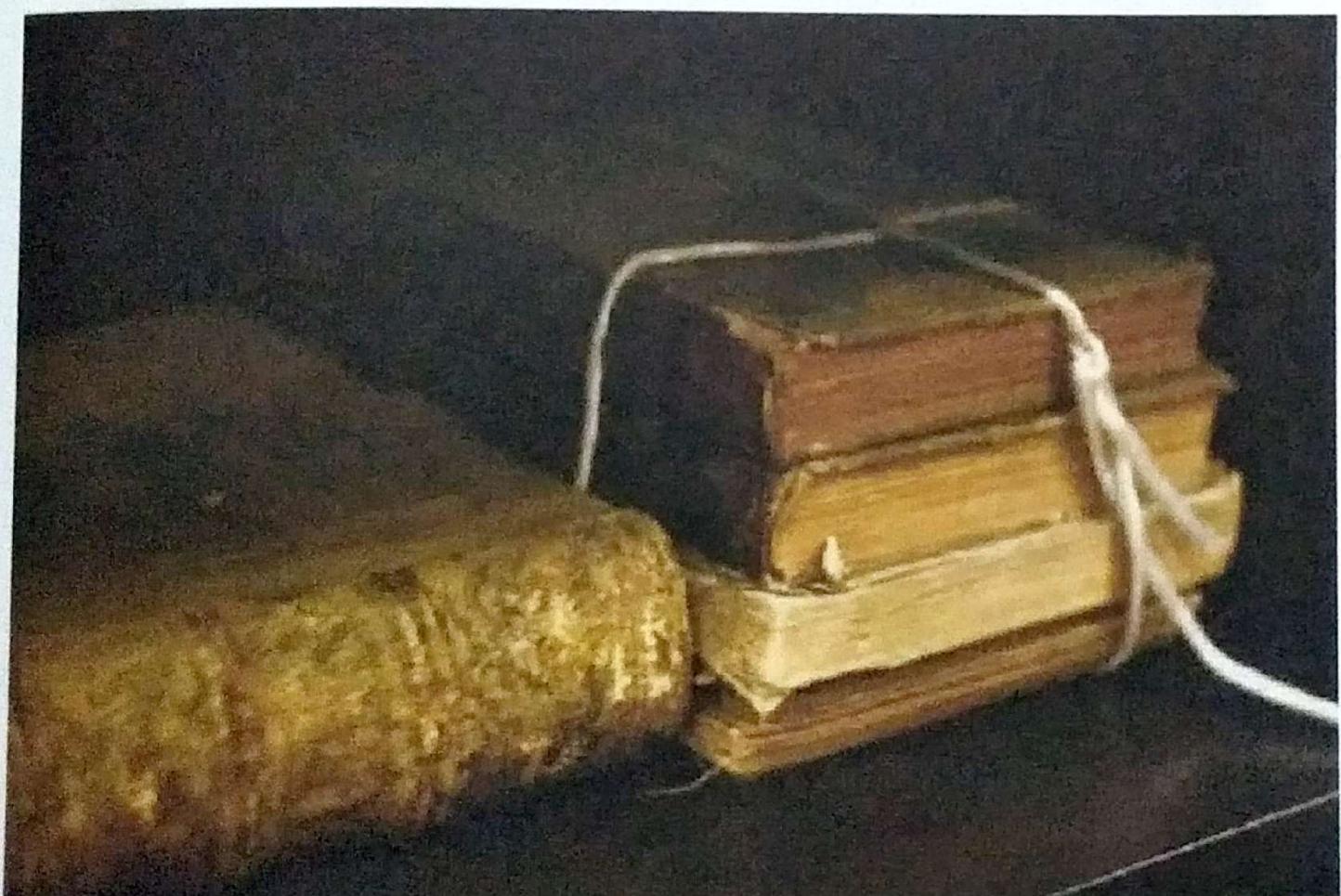
A good example of the travels of the companions was that of Jabir Ibn Abdullah. He lived in Madinah and took more than a month, through 1,400 kilometres, to travel to Sham (present-day Syria) to see Abdullah Ibn Unais only to hear one hadith that was remembered by him alone. Also, another companion named Abu Ayyub Al Ansari travelled over 2,000 kilometres from Madinah to Egypt to hear just one hadith, which was memorized by none other than Uqbah Ibn Amir. After hearing it, he took months to return to Madinah in order to record and propagate the hadith. Such dedication stirred up the Muslim community's enthusiasm to study, research and build a society of wisdom. To conclude, the collection of the Quran and hadith played a major part in building the Islamic civilization.

Many Muslims continued to travel to learn hadith in the first three centuries after Muhammad's death, and narrations of the hadith were passed on from one generation to another. In response to that, authentication and classification of the hadith were developed academically. This in turn produced a lot of muhaddith, or transmitter or interpreter of hadith travelling from one place to another in both Arab and non-Arab nations, in order to learn the holy traditions of the Prophet. Abdullah Muhammad Ibn Ismail ibn al Mughirah ibn Badizbah al Aljufi al Bukhari, well known as Imam al Bukhari, was the most reliable muhaddith. His collections of hadith are unarguably the second most authentic books, following the Quran.

Imam Bukhari was born in 810 A.D., or 178 years after Prophet Muhammad's death, in the city of Bukhara in Khurasan (present-day Uzbekistan). His father was also a well-known muhaddith, who died when Imam Bukhari was very young. At age 16, Imam Bukhari followed his mother and older sister to Madinah, studied in the Arabian Peninsula and travelled across the Middle East. It is said that he memorized 70,000 reports of hadith. He continued to collect other pieces of hadith and ended up engraving 300,000 reports in his memory. He spent 16 years analysing and verifying them, most of which by visiting individuals or families of those who reported the hadith. He classified hadith into three categories, including sahih (authentic), hasan (fair) and dha'if (weak).

The renowned muhaddith judged each piece of hadith based on uninterrupted chains of narrations that continued for almost 200 years, selecting only those that did not contradict stronger chains of narrations and had no errors. Also, the reporters must have had excellent memory as well as be just, impeccable individuals. He excelled in narration chains of hadith to the point that he knew every person in the chains of narrations and could identify them in an instant, from the last narrator to the Prophet. If he found at least two chains of narration occurring at the same time with the narrators not knowing each other, despite living in the same place and time, he would disqualify them, even though they were believable. In the end, Imam al-Bukhari managed to verify 7,275 reports of authentic hadith with strong chains of narrations and he combined them into nine volumes of hadith known as Sahih al-Bukhari. It was discovered later that 2,602 of the reports were unrepeatable.

It is very interesting that the methodology of Imam al-Bukhari to collect the hadith involves evidence seeking, tracking and witness finding, which are similar to present-day criminology and forensic science processes. The hadith expert was born 369 years prior to Song Chi, a Chinese scholar recognized as the pioneer of ancient forensic science; and 1,030 years before Han Cross, a German scientist praised by Westerners as the founder of modern forensic science. This means that Imam al-Bukhari had developed forensic science long before them. Thus, it should not be wrong to conclude that he was the true father of forensic science.





Chapter 9 Embryo

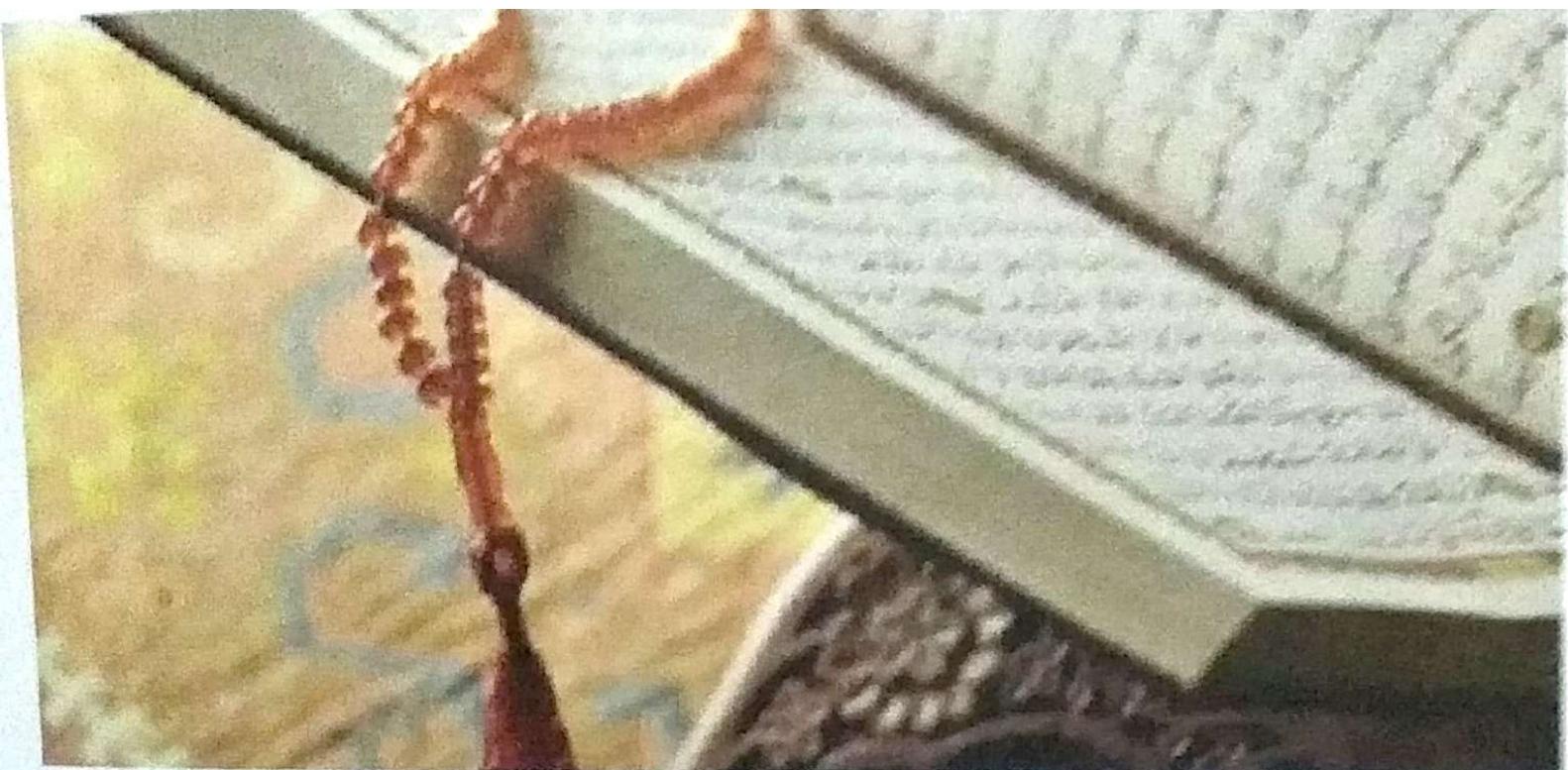
The collection of the Quran was initiated during Muhammad's time and completed about two decades later. As for the collection of hadith, or the Prophet's traditions including sayings, deeds, recognition, refusal, personality as well as routine from his birth to death, it was continued for centuries although the Prophet had died. These contributed to academic development of both Arab and non-Arab Muslims to uplift their society and create fields of sciences, from which the prosperous Islamic civilization flourished.

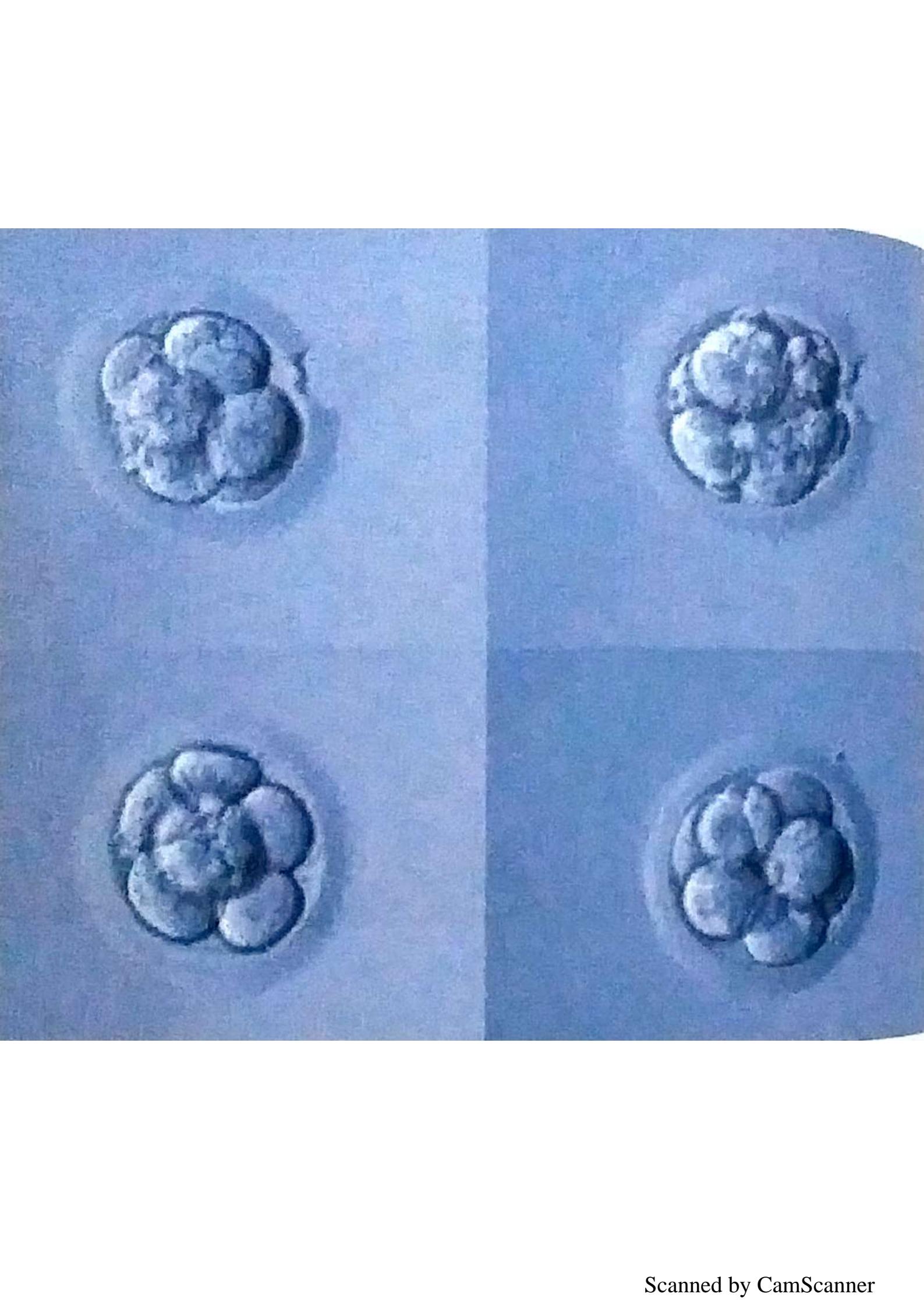
Before the Quran was completely collected, it had been strictly proofread and put through oath making. It has remained unchanged for over 14 centuries and all content in the Holy Book has been analysed by numerous Muslim and non-Muslim scholars. It has been academically recognized that the Quran is the best thing that ever happened to Muhammad. It is utterly amazing that throughout the 23 years in which the Quran was revealed to the Prophet, none of its 6,236 verses in 114 chapters ever contradicted any others. In conclusion, the Quran is Muhammad's greatest miracle.

Prophets in Islam who had been sent before Muhammad, including Abraham, Moses, Jesus and others, were found in scriptures to have had supernatural miracles, whereas stories of the final prophet, Muhammad, were recorded in a number of reports of hadith, which agreed that he was an ordinary human being who had no superpowers but one book bestowed upon him by God.

T.V.N. Persaud, a professor of several medical fields at University of Manitoba, Canada, with a number of academic works as well as medical prizes, made mention of Muhammad in a book he authored, This is the Truth, edited by Abdullah M. Al-Rehaili and published in 1998. He wrote that in regards to sciences, especially medicine, the Quran has many verses that revolve around knowledge of modern day medicine. He concluded that the book could not have come from anywhere else but from God through an illiterate, ordinary man named Muhammad. There is no evidence that this man learned anything about science in his lifetime. Again, Muhammad's greatest miracle was the Quran.

The Holy Book contains verses that involve everything. About 750 verses or 12 per cent of it have been acknowledged by both Muslim and non-Muslim scholars to be related to science, mostly medical science. Dr. Persaud confirmed that none of the verses contradict modern day findings. Besides, much research has been conducted to compare the contents of the Quran with several fields of modern knowledge, including science, medical science, engineering, astronomy, chemistry, physics and so forth.

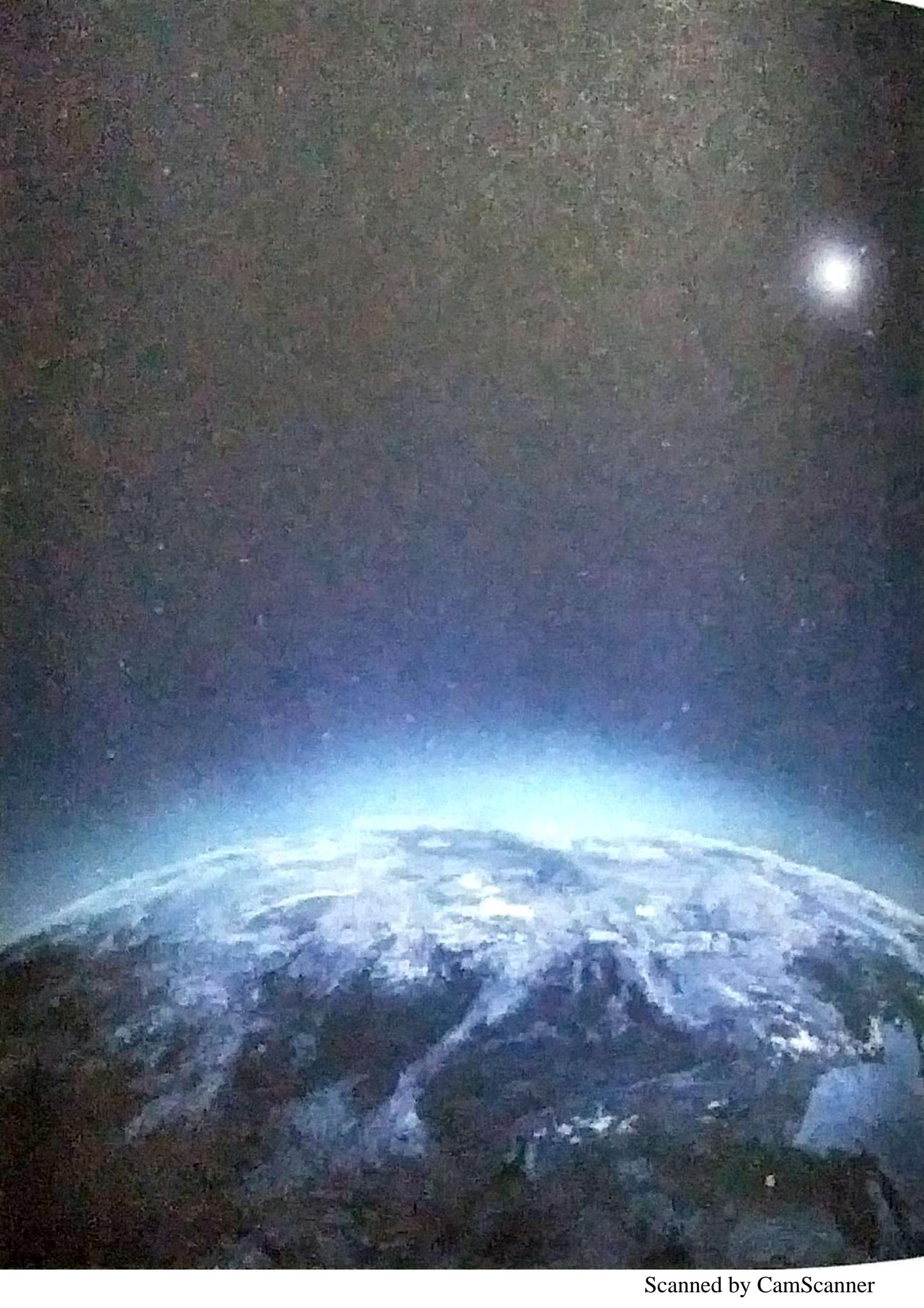




In modern days, when some Western scientists intend to use an embryo that is less than a week old for its stem cells, strong resistance from religious factions emerge, claiming that the practice is a destruction of human lives. Therefore, those scientists have to find other sources of stem cells. On the other hand, Islamic scholars say that, based on Islamic explanation, an embryo that is younger than 40 days is not regarded as a complete organism because it lacks a soul, which is a crucial component of life. This conforms to medical facts and also points out that science and Islam include well-aligned views.

There are many other medical scholars who attest that Muhammad's interpretations of the Quran in relation to medical science and other fields of science are amazingly factual. Dr. E. Marshall Johnson, a professor in biology at Thomas Jefferson University in Pennsylvania said that medicine a thousand years ago might have some knowledge about, but was not adequate to describe, the mechanism of life in as detailed a manner as Muhammad did using the Quran. It was as if the Prophet had seen the inside of the mechanism of life himself.

Before learning the background of Muslim scientists from a thousand years ago who enhanced scientific knowledge based on the contents of the Quran described by the people in Muhammad's era, their prominence, and how much of their accomplishments have been studied and extended by the Western world, we should first look into how the Prophet explained scientific facts that appeared in the Holy Book.



Chapter 10

Earth

Muhammad, who was responsible for explaining words in the Quran to mankind, demonstrated the Book's contents by giving several examples from his knowledge. Nonetheless, even the examples that came from a fellow human were too difficult for people 1,400 years ago to understand. As a result of the disability to understand the explanations, the people rarely asked questions, and thus the Prophet did not have a chance to clarify. Many of his illustrations of the verses of the Quran became more accepted and understood centuries later, when science and technology became much more developed. It was in recent generations that scientists began to understand the examples given by Muhammad and to present Muhammad's sayings, which have been recognized to be academically correct. As mentioned before, the Quran is Muhammad's greatest miracle; his interpretations of the Book are not considered to be miraculous.

What will be mentioned here appear in reports of hadith. Firstly, Muhammad said that Islam would spread as far as night and day, covering every area on the face of the earth. In this piece of hadith, there are two subject matters explained: one about the Muslim Ummah (Community), and the other about time. People in the past could not understand this hadith but modern science has proven its precision. In the case of the Muslim Community, population statistics have confirmed that it is present in 196 countries around the world, including Taiwan. Every single country has a number of Muslims. Also, it is estimated that in 2025 A.D., Muslims will make up one third of the people in the world. In other words, Muslims will comprise the majority of the world's population.

Surprisingly, countries with the highest growth rate of the Muslim population turn out to be those in the Americas, including Argentina and Brazil, in which there were hardly any Muslims before. Nowadays, the two countries house millions of Muslims. In a North American country such as Canada, the Muslim population has increased from a hundred thousand to nearly 2 million in the last 20 years, whereas the United States has seen a rapid growth rate of the number of Muslims, reaching over 10 million people. Japan also used to have very few Muslims but currently, Islamic activities are growing widespread; in fact, the rapidly increasing number of new mosques and Muslim communities have spurred the Japanese government to initiate halal tourism in the country to attract over 20 million tourists by 2020 A.D., four million or 20 per cent of whom are expected to be Muslims. These examples prove that what Muhammad said 1,400 years ago was nothing but the truth.

In terms of the overlapping of time, the hadith indicates that day and night span the earth, which implies that day and night happen simultaneously on the globe. However, people in Muhammad's time did not understand the true meaning of this because they had no idea how day and night could occur at the same time, thinking that the globe was flat. Regarding this issue, Muhammad rephrased a verse in surah, or chapter number 39 named Az Zumar verse number 5 of the Quran, which describes the world having day and night concurrently.

خَلَقَ السَّمَاوَاتِ وَالْأَرْضَ بِالْحَقِّ يُكَوِّرُ النَّلَّا عَلَى النَّهَارِ وَيُكَوِّرُ النَّهَارَ عَلَى الْأَيَّلِ وَسَحَرَ الشَّمْسَ وَالْقَمَرَ
كُلُّ بَحْرٍ لِأَجْكِلِ مُسْكَنٍ أَلَّا هُوَ الْعَزِيزُ الْغَفُورُ

"He created the heavens and earth in truth. He wraps the night over the day and wraps the day over the night and has subjected the sun and the moon, each running [its course] for a specified term. Unquestionably, He is the Exalted in Might, the Perpetual Forgiver."

In addition, in chapter number 79 (An Naziat) verse number 30,
Allah says:

وَالْأَرْضَ بَعْدَ ذَلِكَ دَحَنَهَا

"And after that, He spread the earth."



Muslim scientists were, in fact, the first to confirm that the earth is round, and they did so centuries before the Europeans. In 885 A.D., or 253 years after Muhammad's death, a Muslim scientist named Ibn Khordadbeh (820 – 912 A.D.) reported that the earth was round like a yolk inside a whole egg, which represented the universe. In 903 A.D., Ahmad ibn Roste Esfahani or Ibn Rustah gave his opinion that Allah created the universe in a shape of a ball with nothing inside other than the earth and other round stars in its orbit. Moreover, there were many other Muslim scientists who confirmed that the world is round, including Ahmad ibn Muhammad ibn Abdu Rabbih (860 – 940 A.D.) as well as astronomist Abi Ubaidah bin Ahmad or Abi Ubaidah. All of them mentioned the earth as a circular planet.

In 820 A.D. or the early 9th Century, while Europe was still in the Dark Ages believing that the globe was a flat surface surrounded by oceans, Caliph Al-Ma'moon of Baghdad ordered scholars to split into two teams with Sanad ibn Ali and Ali ibn Isa Al-Asturlabi as the leaders to measure the world's perimeter. As a result, they did not only conclude the length of the equator to be 39,986 kilometres (which deviated 89 kilometres or 0.22 per cent from the correct number), but they also determined the world's longitude at 360 for the first time. Longitude is the geographic coordinate that determines the difference of time based on the Earth's rotation. This points out that the Muslim World discovered that the Earth is round a thousand years ago – well before the Europeans included this knowledge in their school lessons.

In 1262 A.D., astronomist Abu Ali Al-Marakishy defined the relation between longitude and time so that Muslims around the world could prescribe times for their five daily prayers, which varied from one area to another. After that, mathematician Al-Biruni created a flat world map on a paper with longitudes and latitudes, which later became the model of modern day map making.

In addition, Muhammad said later that the imposition of prayer and fasting times should be in accordance with local times, which was likely to emphasize that different areas on the Earth had different days and times. Nonetheless, the people in his time did not understand this concept and nobody could have imaged the world having time differences. It was stunning how an illiterate man knew the facts that appeared in the hadith regarding the Earth's round shape as well as the time differences. The hadith intensified the correctness of the information given in the Quran, the undisputed miracle of the man named Muhammad.



Chapter 11

Soil

Another saying of the Prophet that has been scientifically proven is about soil. He said in a report of hadith narrated by Imam Muslim that soil was created for prostrating to God and for purifying. In regards to the latter, Islam prescribes that soil be used as a cleaning material of things that are particularly ritually unclean called najis mughallazah, such as dog saliva. Also, many Islamic scholars categorized pigs in the worst najis category, and this type of impurity can only be cleaned by using soil.

Prophet Muhammad said :

إِنَّمَا أَحَدُكُمْ إِذَا وَلَغَ فِيهِ الْكَلْبُ أَنْ يَغْسِلَهُ سَبْعَ مَرَّاتٍ أَوْ لَهْنَ بِالْتَّرَابِ

"When a dog licks anyone's vessel, wash it seven times, the first time with soil water."

Apparently, there was never such advice before Muhammad came to this world. The question is why Muhammad ordered his companions to use soil for cleaning the najis despite the fact that it has been regarded as a source of dirt, no matter how advanced science has become.

In Islam, dirt is mentioned positively several times. In addition to washing unclean things, Islam teaches that the first human was created from the soil and that Muslims can perform tayammum (dry ablution) with clean sand or dust in case that they cannot find water. These also led to the question of what scientific reasons can explain the benefit of soil. In fact, quite a number of people believe that soil is filthy, and some medical doctors even regard soil as the root of drug resistance. Antimicrobial resistance is the biggest medical problem in recently found pathogens, which precipitates the increasing use of medicine. It was even said that the antimicrobial gene originated from soil. Regarding this, Prof. Jo Handelsman, a globally reputed microbiologist at Yale University, said during the Council for the Advancement of Science Writing Conference 2010 that even though other people thought soil to be the source of problems, she believed that soil was the solution to every instance of drug resistance.

Dr. Handelsman said that she never regarded soil as an unclean material. She admitted that numerous bacteria in soil contained antimicrobial genes. However, according to research conducted on soils around the world, her research team never found soil bacteria that resists antibiotics used in humans. In fact, pathogenic bacteria are not from soil. In addition, Dr. Handelsman and her colleagues discovered that soil was a source of microorganisms to create new antibiotic drugs that deal with antimicrobial resistance. In addition to not being troublesome, soil is also a drug that tackles such problems, she concluded.

Many scientists found that some soils have the activity to kill almost all types of pathogenic bacteria. According to studies of the antibacterial activity of soil, it was found that putting pathogens in soil solution for 24 hours would destroy all of them, whereas dipping them in other solutions would allow them to split 45 times. This information led to the conclusion that most antibiotics found in soils were created from microorganisms dwelling in the soils.

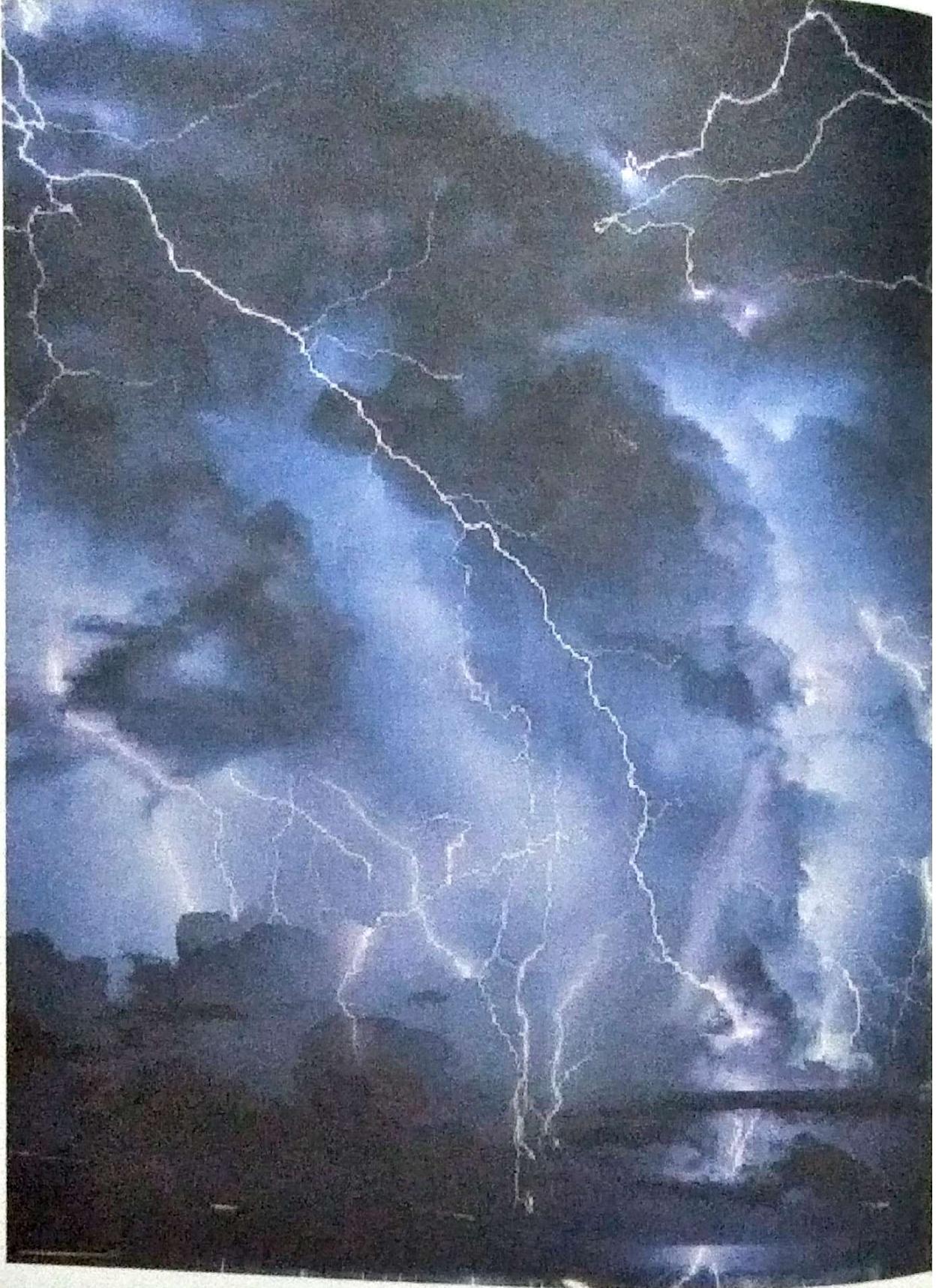
Since 1996, I have been working on halal examinations with the Sheikhul Islam Office of Thailand and started my job with Bangkok Islamic Committee regarding halal inspection in 1999. I often encountered problems regarding cleaning the heavy impurity in industrial productions. Islamic scholars have suggested using a soft-prepared chalk solution instead of water mixed with soil for washing the heavy najis, which is more acceptable to industry. However, washing with soiled water brings about environmental problems, consumes much time, and requires labour and money.

Therefore, I initiated a new innovation in 2004 with an idea to develop soiled water into clay liquid that can be used instead of soap. To begin, I used bleaching clay processed from the vegetable oil industry. This turned out to be a degree of heavy impurity cleanser. Nonetheless, after it was suggested to Mr. Thongkham Mahamad, an Islamic expert at Bangkok Islamic Committee for interpretation, he said only pure, unprocessed and unused soiled water could be used for cleaning the heavy impurity, even though all of the materials used for flocculation came from soils. This decision deemed my work ineffective and made me start everything over. It took me five more years and millions of baht to successfully develop a new project.

In January 2009, the Halal Science Center, Chulalongkorn University published a research report entitled Development of Clay Liquid Detergent for Islamic Cleansing and the Stability Study in the International Journal of Cosmetic Science. It was the first time ever that a research effort was conducted to develop clay soap for practical cleansing in accordance with Islamic teachings.

The clay liquid was produced without any use of chemicals. It has the quality to wash dirt or grime, identical to that of common soaps. Normally, soaps are produced for eliminating fat stains that are difficult to take away. As for the clay soap developed by the Halal Science Institute, it is more capable of removing fat stains. Besides, according to disinfection examinations, the soil solution developed from clay and seven clay compounds is more capable of killing bacteria than a common soap. Despite this ability, its selling price is not much different from industrial laundry detergents. Thus, the Halal Science Center's clay liquid has been widely popular among Islamic organizations in Thailand as well as in industry.

This innovation is an undeniable proof that Muhammad's mentioning of the use of soil for purification was factual. He said it long ago and the proof was discovered 1,400 years later by Muslim Thai scientists. It was surely and proudly not too late.



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Chapter 12

Thunder

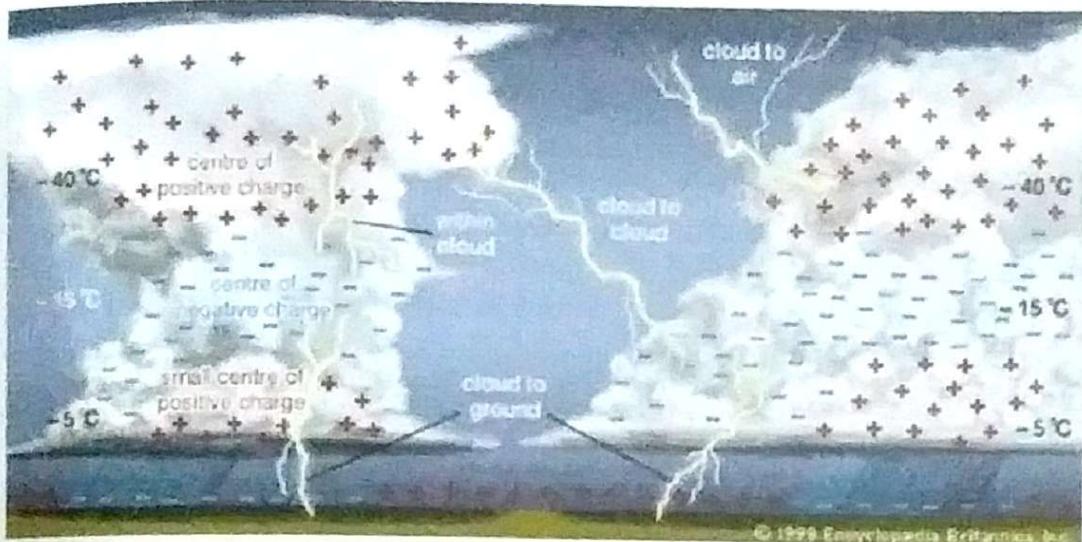
One of the major beliefs in Islam is the belief in Akhirah (afterlife). Muslims believe that the thousands of millions-year-old Earth and everything else, including mankind, will meet an end. This is the day of the Akhirah, and after that, humans will be resurrected on the day of Qiyamah (resurrection).

According to many reports of hadith, Prophet Muhammad mentioned the Day of Judgment or Yawm al-Qiyamah as well as the Hereafter or Akhirah several times. Regarding the end of the world, the Day of Resurrection, the Day of Judgment or the Hereafter, both Islam and Christianity have the same belief because they have the same origin.

Regarding the Day of Resurrection, Imam Muslim reported that Muhammad mentioned a straight road that will occur on that day. The Prophet further said that, "Do you not see that the thunder came down and went back up in a blink of an eye?" This short saying was recorded with any further explanation as to whether people of that era understood the Prophet's words. In fact, even in modern days where humans have better knowledge in science, not many would understand the intended meaning of the hadith.

Regarding two simultaneous thunderbolts, modern scientists have developed a better understanding about the issue. Many pieces of research have been conducted on this, leading to the same conclusion that every thunderbolt comprises two strikes, which occur at an extremely high speed within milliseconds, starting with a downward strike followed by an upward strike. The phenomenon occurs almost simultaneously, which makes the two strikes look like one. This corresponds to what Muhammad said 1,400 years ago.

A thunderbolt is a natural phenomenon formed by the sudden movement of electrons from an area with dense negative electric charges to a positively charged point. This phenomenon can occur in one single cloud or two different clouds, or between a cloud and the ground. It results in a flash or lightening bolt followed by roaring thunder. If a thunderbolt hits something on the ground, its sound will bang like a large explosion. Nonetheless, nobody would think of it as two strikes happening at almost the same time.



A thunderbolt is formulated by the transfer of electric charges in the atmosphere, starting with a storm or strong wind. When the wind, consisting of numerous gas molecules, passes by the ground or buildings, the molecules quickly graze against the ground or an object, pushing away electrons that are circulating on the outermost of the molecules on the ground or the object along with the wind. Losing the electrons, the molecules become overall positive and heavy. Thus, they are hard to move and remain stagnant, while electrons are small in size and can move out easily.

Electrons that shift from the molecules on the ground or the object while flowing along with the wind are blown up toward the clouds, which float moderately high when it is about to rain. These clouds are full of water molecules, which are better conductors than air. The electrons together with the wind get pulled by dense water vapour into the stomach of the clouds, allowing them to intensify the electrons and form negative charges. The movement of air mass between the top and stomach of the clouds pull down additional water vapour molecules, thus accumulating electrons beneath the clouds while the top of the clouds is getting increasingly positively charged.

When these happen in an instant, positive charges gather on the Earth's surface while electrons or negative charges formulate increasingly beneath the clouds, creating gravity between the protons and electrons. As a result, electrons are transferred from beneath the clouds at an extremely high speed, causing air pressure to split instantly. When the moving air re-joins, it creates a loud sound of an explosion with a flash. All of these result in a thunderbolt.

According to studies, scientists have found that the number of electrons transferred to the ground is far greater than that of the protons on Earth because they are added by the electrons from clouds. As a result, the downward strike brings electrons from the clouds to the ground at a speed of 100,000 kilometres per second, transferring a large number of electrons from the clouds to the ground, changing the ground from positive to negative charges. Meanwhile, the clouds change to positive charges. The sudden voltage results in a second thunderbolt that goes upward.

The difference in electric charges looking for equilibrium causes an overflowing amount of electrons on the ground to go back up to the clouds. The second bolt thus occurs in a split second. Using high-speed cameras, scientists found that the two strikes go down and up in four phases, including the flowing of electrons, the equilibration of molecules on the ground, the flowing back of electrons to the clouds, and the equilibration of the clouds. All of these happen within 0.04 seconds or 40 milliseconds.

According to scientists, the blinking speed is about 10 to 20 milliseconds, depending on sleepiness and brain exhaustion. The phenomenon of a thunderbolt striking down and going up was mentioned by Muhammad to occur in a blink of an eye, and it was scientifically proven a thousand years later. Obviously, his saying was factual, which surprised modern scientists as to how an illiterate person knew about the natural phenomenon in detail. However, those who doubt the Prophet's knowledge would come to clarity if they read a verse of the Quran which says,

وَمَا يَنْطِقُ عَنِ الْهُوَىٰ ۚ إِنَّهُ لَوَّهٌ يُوحِيٌ ۚ

"Nor does he speak from [his own]. It is not but a revelation revealed, taught to him by one intense in strength." (Sura An Najm Chapter no. 53, verses 3-4)

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Chapter 13

Brain

Muhammad spoke of many things that were later proven to be academically correct. He once talked about the forebrain, which was later found by scientists to be related to behaviour. As an introduction to this part of the brain, the fontanel has to be mentioned. The fontanel is a space between the bones of the skull of an infant or foetus near the forehead with noticeably soft sutures. It is most visible in new born to two-year-old babies. It develops into hard bones when the children grow up.

There is an Arabic word *nasiyah*, which is often translated as "forelock." In fact, this word means the part of the brain that is beneath the fontanel or near the frontal lobe, not the fontanel itself, which is a part of the skull. The word *nasiyah* is mentioned three times in the Quran, and it is also found in many hadiths.

The word nasiyah appears twice in Surah Al Alak Chapter no. 96 verses 15 – 16.

كَلَّا لِمَنْ يَنْهَا لَتَسْفَعُهَا بِالنَّاصِيَةِ ١٥ نَاصِيَةٌ كَذِبَةٌ خَاطِئَةٌ ١٦

"Yes, if he desisted not, We will assuredly drag him by catching his forelock hairs. Forelock of what type, lying, sinful."

Also, it is present in Surah Hud chapter no. 11 verse 56.

إِنِّي تَوَكَّلْتُ عَلَى اللَّهِ وَرَبِّكُمْ مَا مِنْ دَآبَةٍ إِلَّا هُوَ أَخْدُونَا صِرَاطَهُ إِنَّ رَبِّي عَلَى صِرَاطٍ مُّسْتَقِيمٍ ٥٦

"I relied on Allah, my Lord and your Lord. There is no moving creature whose forelock is not under His control. No doubt! My Lord meets on a straight path."

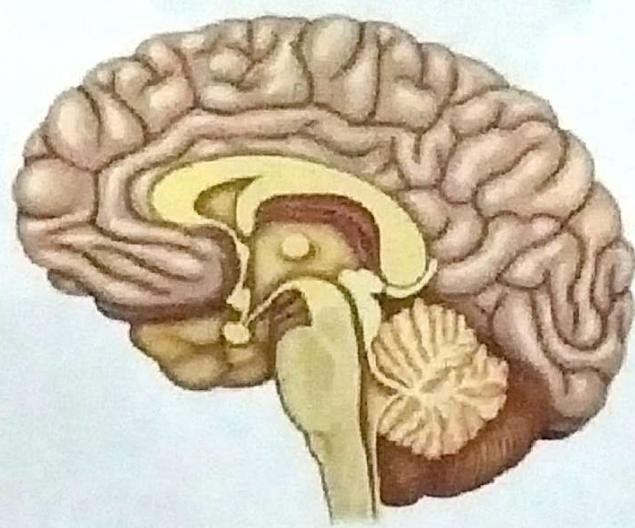
The Holy Quran mentioned the word nasiyah, or forelock, in the 7th Century while scholars confirmed that during that time, before it and hundreds of years later, there was not any individual or any book in any civilization that even cited a word about the frontal lobe. In the past, scientists did not understand how the brain works and ancient people did not even know what the brain does in general. However, the Quran describes the frontal lobe to be involved in directing decision making on both good and bad things. To be more specific, God emphasizes in the Holy Book that he will control this particular part of the brain, which is related to wrong conduct and evil deeds. Humans need to know how to take control over this part of their brains. These verses are such miracles. How did the Quran have the scientific facts?

After the verses about the forelock were revealed, Muhammad made a supplication to God. According to a hadith reported by Imam Ahmad bin Masud, Muhammad said that, "O Allah, I am Your slave, the son of Your slave. My forelock is in Your Hand. Your judgment of me is inescapable. Your trial of me is just. I am invoking You by all the names that You call Yourself that You have taught to anyone in Your creation, that You have mentioned in Your Book, or that You have kept unknown. Let the Qur'an be the delight of my heart, the light of my chest, the remover of my sadness and the pacifier of my worries." (Source: Musnad Ahmad No. 1/391)

Considering this report, the Prophet understood the importance of the forelock and surrendered it to God to direct him to the right path. His companions did not understand when they heard it and asked him if they should pray for the same thing. The Prophet suggested they do so, despite people of that era having no knowledge or understanding.

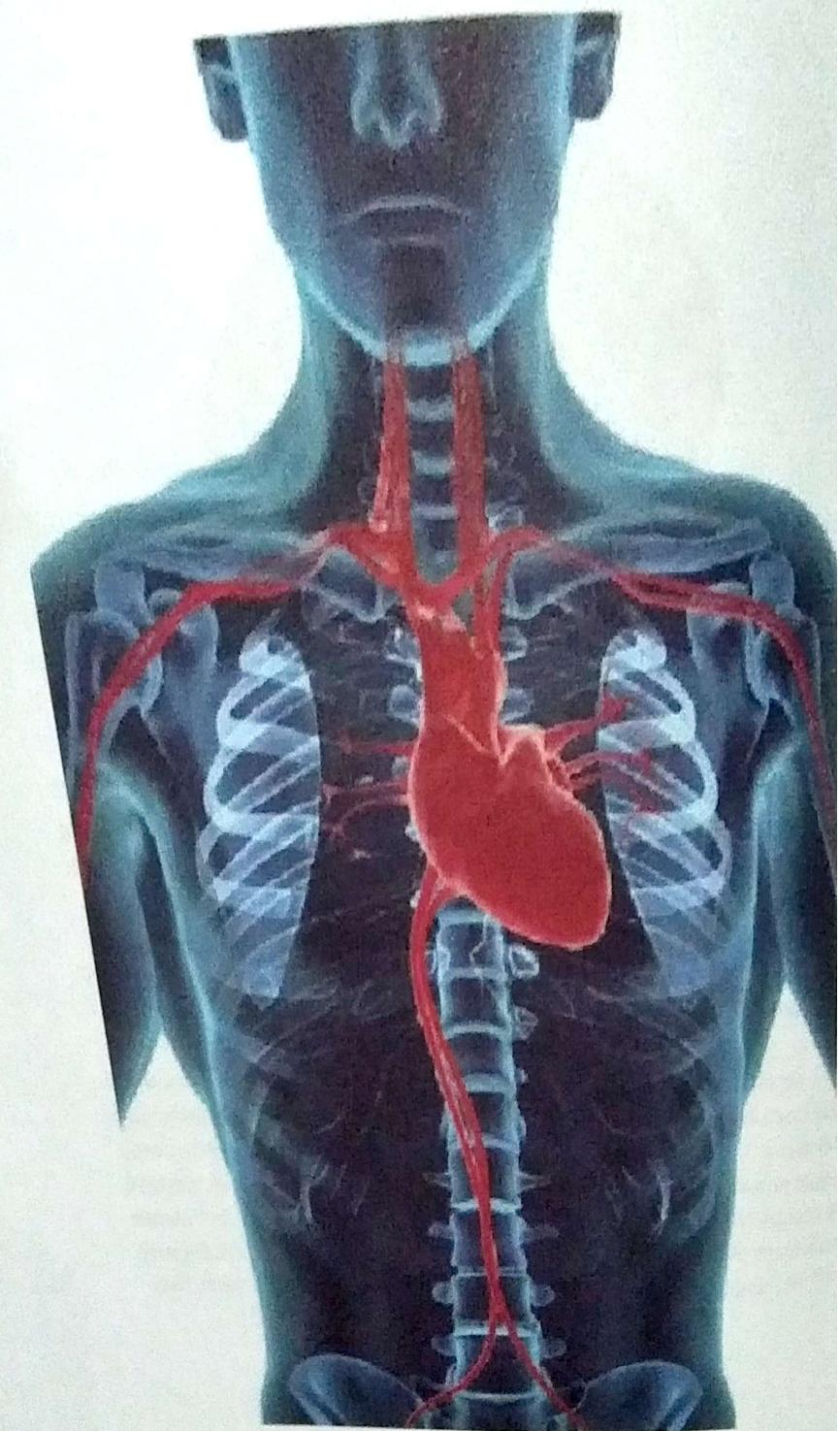
Academically, it is widely known that the frontal lobe controls physical movements, pronunciation, thinking, remembrance, intelligence, personality, feeling, emotion, perception, understanding, reasoning, problem solving, speaking and long-term memory. More importantly, the posterior frontal lobe was found to control all muscles that are not directed by the autonomic nervous system (such as the movement of arms, legs and face). This is called the motor cortex. It took over a thousand years before scientists discovered the functions of the frontal lobe, which confirmed the Quranic verses and hadiths mentioning this particular part of the brain administering reasoning and behaviour.

Prof. Dr. Keith Leon Moore, a global embryology expert at the Faculty of Surgery, Toronto University, Canada, was invited by King Abdulaziz University, Saudi Arabia in 1980 to give a lecture in which he said the Holy Quran mentioned the frontal interlope or forelock. This particular part of human and animal brains determines their behaviours. As for humans, the forelock defines what is good and what is bad.



The embryologist added that no scholar was aware that the forelock was related to human and animal behaviours until centuries later. No civilization appeared to even bring it up before. But the Quran was the only book that has mentioned it and the final Prophet of Islam emphasized it. This was evidence that the Quran came from God and was conveyed to Prophet Muhammad, Dr. Moore said.

He also gave information that discovered that the animal forelock possesses the same function as that of humans, which is determining behaviour. This is more amazing because the Quran said God did not only create humans, but also many other organisms; Muhammad was the one to confirm this. This also points out that God gives freedom of behaviour to humans and animals. But we have been created and given sublimity, and we humans need to learn to control our behaviour, the Prophet said.



Chapter 14

Heart

On many occasions, Muhammad predicted a number of events to take place before the End of the World. Some Hadith scholar made a collection of hadith regarding 72 such events, covering minor and major ones, far from the Hour and close to it. Among those, there is one related to science, although minor. The prophecy indicated that when the End of the World draws near, humans would increasingly die sudden deaths. This hadith was reported by Al Tabarani.

However, the Prophet did not specify what would cause sudden deaths, whether it was diseases or incidents. Besides, people in his time did not understand what he said because such deaths were rarely seen. Modern Islamic scholars have witnessed numerous deaths from heart attack and brain death caused by cardiovascular diseases, and believed that these lead to sudden deaths as foretold by Prophet Muhammad.

Cardiovascular diseases (CVD) have many causes. Unbalanced nutrition is the most common factor that leads to sudden death, most of which is over-nutrition or over consumption that leads to obesity, diabetes, dyslipidaemia or abnormal amount of fat in blood, hypertension and many others. Patients tend to die from sudden cardiac arrest, which has become the third largest cause of death by disease. Millions of people die from cardiovascular diseases every year.

Heart and blood vessel disease generally refers to conditions that involve narrowed or blocked and stiffened blood vessels by many different nutrients such as fat, protein and minerals, which obstructs blood from nourishing the heart muscles or brain. When the vessel walls are torn, it activates blood coagulation, building a large blood clot to close the blood flow. As a result, the part of heart muscle supplied by that artery begins to die.

Besides cardiovascular disease, there are reports of hadith pointing out other illnesses. In the hadith collection of Imam Ahmad ibn Hanbal, it was narrated that Usamah ibn Shuraik said, "I was with the Prophet when the Bedouins came to him and said, 'O Messenger of Allah, should we seek medicine?' He said, 'Yes, O slaves of Allah, seek medicine, for Allah has not created a disease except that he has also created its cure, except for one illness.' They said, 'And what is that?' He said, 'Old age'."

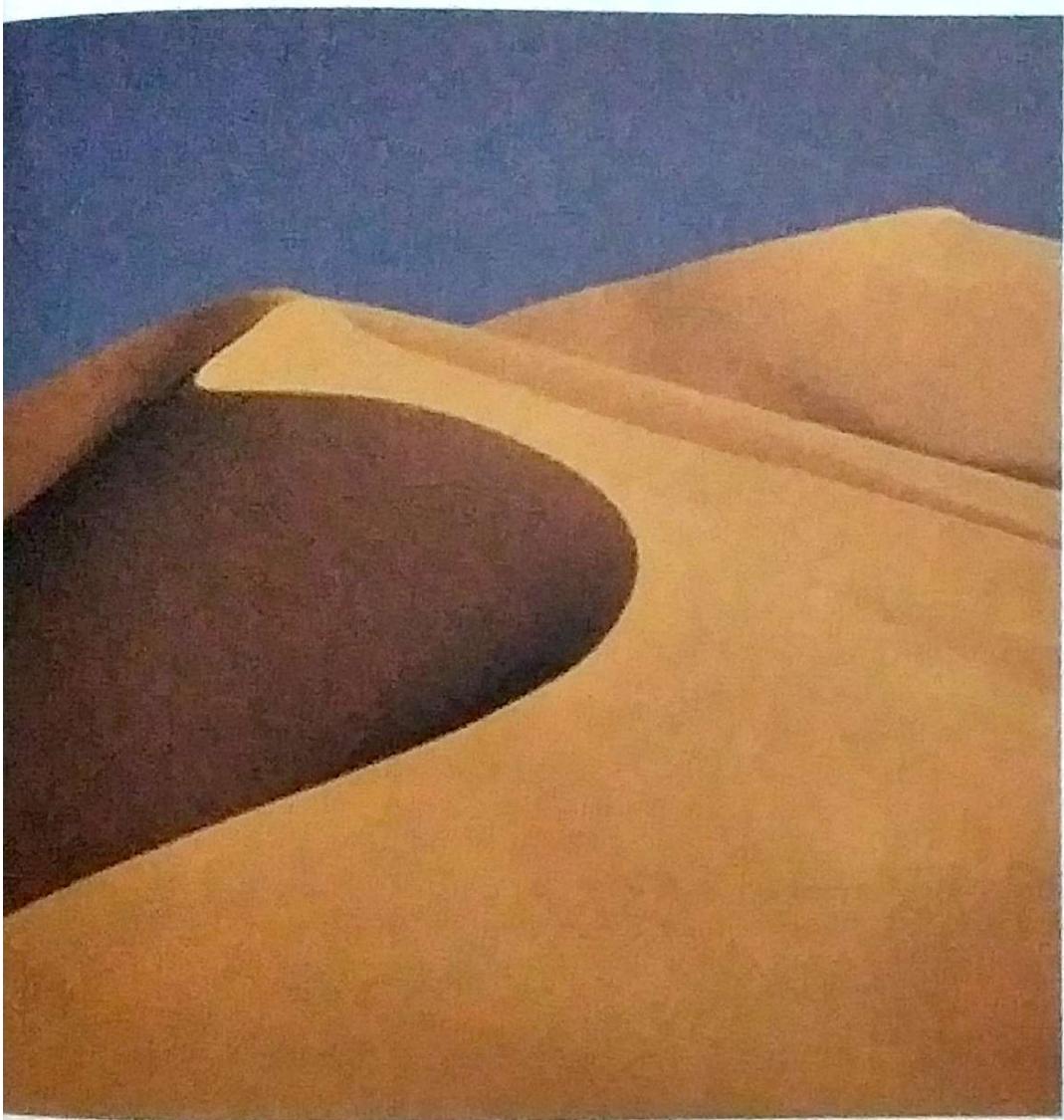
This warning conforms to modern knowledge of science. Medical scientists admit that senility is the best mechanism to stop life. After a long period of time, life is spent; cells and tissues get weakened and stop working eventually. Numerous attempts to stop this natural mechanism results in many side effects, including cancer and other diseases.

Professor Lee M. Silver, a molecular biology expert at Princeton University, the United States, said that scientists' efforts to create eternal life have brought about exact opposite results. One of them is cancer, which is one of the top three causes of natural death in the world. A large number of people around the globe die from it each year. Allowing life to deteriorate naturally and utilizing our experiences to build what is good for later generations certainly makes our lives much more meaningful, as opposed to seeking immortality, which is medically impossible. Eventually, every life has to end.

Also, Imam Muslim narrated that Prophet Muhammad said that the End of the World will not come until Allah changes Arab deserts into a land full of rivers and green plants. Many people do not believe it and are even certain that there will never be the Judgment Day because the Arabian Peninsula is full of sand with rare water resources. This made many people doubt the Prophet's prediction until a miracle happened in 2011.

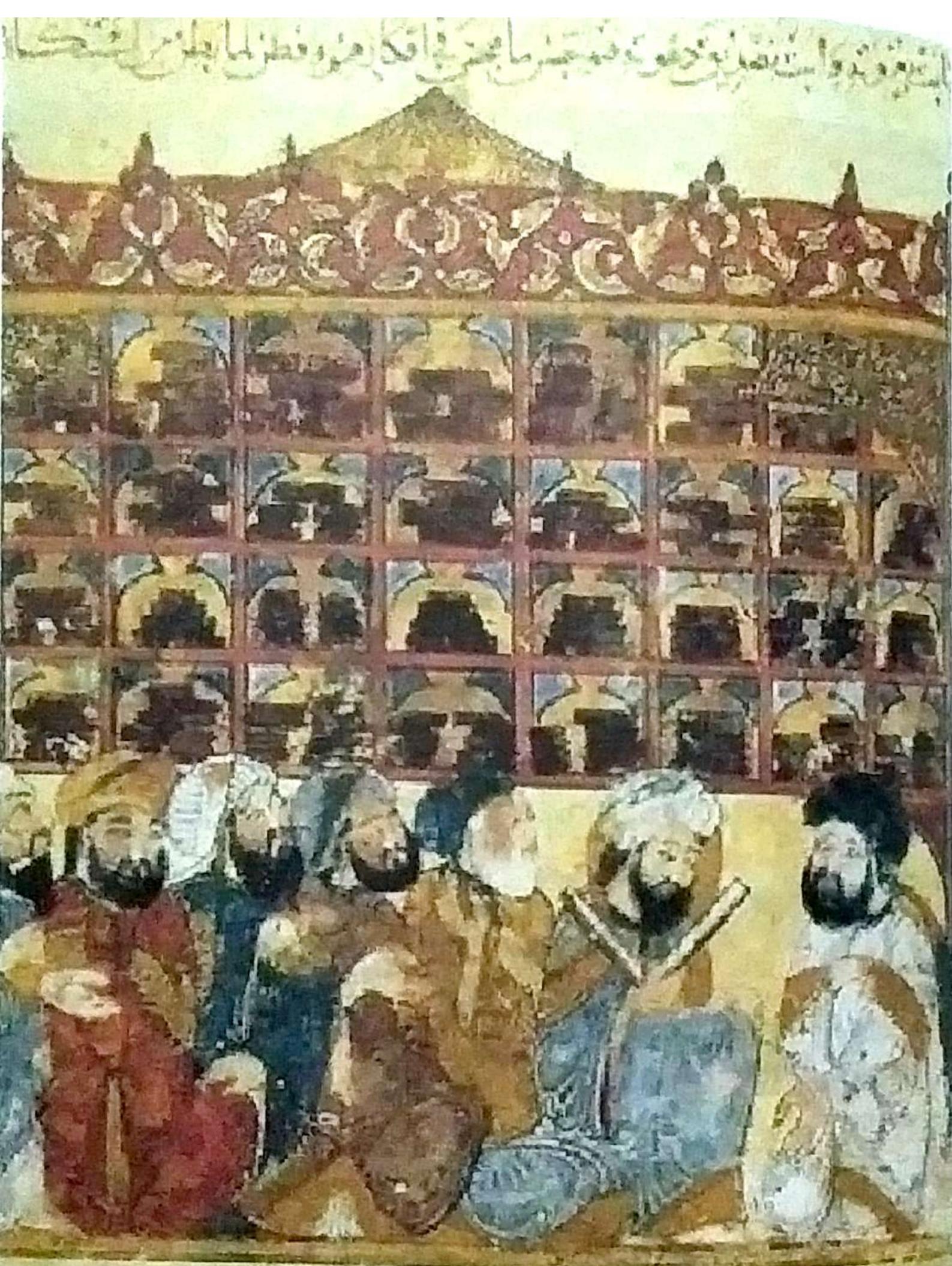
A satellite photo numbered ISS027-E-34290 taken by the National Aeronautic and Space Administration (NASA) on 16 May 2011 and many additional survey pictures proved the confirmation made by NASA scientists as well as Oxford University geologists that beneath Ar Rub' al Khali Sand Sea in the south of the Arabian Peninsula, there are vast sand hills, large rivers and lakes. It can be assumed that hundreds of thousands of years ago, the Arab lands were green like those of modern Europe. They probably turned into deserts tens of thousands of years ago. However, the rivers and lakes have possibly been relocated beneath the deserts, waiting to surface again in the future. It was impossible for Muhammad to know this unless he received such revelation from God.





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Chapter 15

Humans

Going back two decades earlier, people had to search records or books in libraries and bookstores or even borrow them from others to acquire academic knowledge. It was troublesome and time consuming back then. But the world today is in a digital era where we can find all kinds of information in millions of websites available for everyone. Just by clicking, tens of thousands of pieces of information will appear in the monitor in front of our eyes. Nonetheless, every coin has two sides. Searching for information on the Internet is very easy but can bring a lot of trouble, as well. Data that is spread online can be true or false, and positive or negative. Thus, it requires a degree of knowledge as well as experience to filter data from the Internet. In particular, there are a number of sources of both true and false information about Muhammad and science.

First of all, we need to understand that stories about the Prophet are referred to in reports of hadith. In case of hadith related to science, only authentic hadith should be mentioned, discarding all the forced and weak ones. When looking for hadith on the Internet, one should be extremely careful and check for their authenticity from books, if possible. There are also a number of hadith on the Internet and in books that are found to be scientifically incorrect, such as the one that narrates that the Prophet made an explanation about having children and how to choose their gender. These have caused negative comments toward the Prophet. Muslims must be especially patient with this, and not react in anger.

There are not many cases in which the contents of hadith get disputed, and this can be explained. First of all, we need to realize that hadith is different from the Quran. The Quranic verses were recorded while Muhammad was still alive; they were revised by him and his companions, which guaranteed the correctness of the Holy Book. Thus, no errors have been found and the Quran is the Prophet's miracle. On the other hand, hadith contains reports of Muhammad's sayings and most of them were recorded after his death without his knowledge. It portrays the life of the Prophet, which is a reason why it is very different from the Quran.

A number of reports of hadith contain confusing content. This could be because the narrators or reporters saw the Prophet's actions but did not understand his intentions or took them literally, which made the hadith remain unclear or become hard to understand. Besides, the hadith were recorded via chains of narrations from one generation to another. Thus, through hundreds of years, even authentic hadith with strong chains of narrations could be hard to interpret because nobody was aware of the Prophet's intentions.

In addition, Prophet Muhammad was a human being, not a god or angel. People agreeing with the fact that the Quran is legitimate is only logical because of reasons mentioned above. Also, it is admitted that the Holy Book is from God, whereas the hadith came from Muhammad, a human being. Thus, it is understandable if there are some errors in the hadith. In regards to science, defects in the hadith might be due to misunderstanding or misinterpretation. There were cases in which science pointed out that some hadith were incorrect but later proved itself wrong about that point. Lastly, some mistakes could be errors from Muhammad's human nature.

In Sura Al-Kahf chapter no. 18 verse 110:

فُلِّ إِنَّمَا أَنَا بَشَرٌ مِّثْلُكُمْ

"Say (Muhammad) that you are a human being like others."

Therefore, to refer scientific facts to a hadith, one should also consider circumstantial reasons. Many of Muhammad's sayings brought questions to people of his generation and beyond. In the end, modern science has proven a lot of the Prophet's statements to be scientifically correct, including what was mentioned in this book. However, there were some hadith that scientists initially said were wrong but upon re-examination with more advanced scientific process, they were found to be true. In the latter case, the most famous and talked about hadith concerns a fly.

In an authentic hadith by Imam Bukhari, he reported, "Abu Hurairah narrated that Allah's Apostle (Muhammad) said 'If a fly falls in the vessel of any of you, let him dip all of it (into the vessel) and then throw it away, for in one of its wings there is a disease and in the other there is healing (antidote for the treatment for that disease)'." This hadith was strongly criticized because it was unclear whether the Prophet suggested consuming the food or water or not. The hadith seemed to be ambiguous. Besides, modern knowledge of science would never suggest doing so because it is well known that flies can bring diseases. Consuming food or drinks tainted by flies produces risks to one's health.

The scientific world that originally held prejudice against Islam criticized this hadith for decades. However, there are two points worth mentioning about the report. Firstly, the hadith indicated that flies brought diseases and secondly, it stated that they were also a source of cure. The question is whether people in Muhammad's time had knowledge about flies bringing diseases to humans. In fact, they did not even know about pathogens. Since they lacked this knowledge, why did Muhammad make the statement? This is not a very serious issue to be discussed because we all know nowadays that flies do carry some diseases.

The more important issue is about the other wing of a fly, which was said by Muhammad to be a cure. About 20 years ago, some groups of people strongly criticized and doubted the correctness of the hadith, believing that flies could only cause illnesses. Nevertheless, much medical research has been conducted and they confirm that flies indeed are a source of antibiotics.

Chapter 16

Flies

Flies are insects of the order Diptera. The most obvious distinction from other orders of insects is that a typical fly possesses a pair of flight wings on the second segment of the thorax, a pair of halteres on the third segment, and an absorbent mouth with a sponge-like labrum. There are hundreds of species of flies but only a few of them are known to humans or inhabit human communities. Such flies, including the housefly, blowfly and flesh fly, consume food such as meat and leftovers from garbage, usually prowling during daytime in a range of three kilometres. However, they do not like strong sunlight.

Flies are considered to be a pest that can carry serious diseases such as diarrhoea, cholera, salmonella, dysentery, tuberculosis and trichinosis. This is a reason why people hate flies. Prophet Muhammad stated that a fly could bring both disease and its cure. In case of the latter, the best and longest known method of cure by flies is maggot therapy. This kind of treatment has been applied for centuries but it should not have been known a thousand years ago, especially to Arab people during Muhammad's time.

There are treatment properties found in flies. The first was based on reports from the First World War, which lasted from 1914 to 1918. According to the reports, the largest cause of soldiers' deaths was the dirtiness of wounds, which led to the dissipation of poison created by bacteria to the blood flow. There was no antibiotic or antibacterial drug at that time and the first disinfectant was introduced in 1928. Thus, without any antibiotics, a few other methods were used to treat wounds. One of them was allowing flies to lay eggs in the wounds. Surprisingly, the seemingly unreasonable method appeared to save many wounded soldiers' lives.

Dr. Gory R. Erdmann of the Department of Operational Pharmacy, Faculty of Pharmacy, University of Minnesota, Minneapolis, reported in 1987 that laboratory examinations led to a finding that fly eggs created a certain substance that can kill pathogens in wounds. However, it was unknown at the time that the substance found was an antibacterial agent.

In the year 2000, research by the Department of Molecular Biology and Genetics, Cornell University, Ithaca, New York, under the leadership of Dr. O. Lung, conducted a study on fruit flies. They found that during mating, a male fruit fly would release proteins to a female's body to make her respond to the mating. According to the study, the proteins released by the male insect were found to kill many pathogenic bacteria and build antibacterial ability in the fertilized sperm and egg. To conclude, some species of insects, including flies, can produce antibiotic substances.

In 2002, Australian scientists from the Department of Biology, Macquarie University, led by Dr. Joanne Clarke, presented a report at the Australian Society for Microbiology Conference, which was organized in Melbourne, Australia. The research team revealed that their attempts to find an antibiotic agent that can beat human-threatening pathogens led to the finding that the skin or wings of some species of fruit flies possess various antibacterial substances. The substances could be easily distilled by dipping a fly in ethanol or alcohol and then extracting the antibiotics. It has been confirmed that the wings of the body of a fly contain cures to diseases.

In 2008, Dr. Mahesh S. Dharne of India's National Laboratory and his colleagues reported the results of a study on antibacterial activity. The report pointed out that the alimentary canal of a fly contains some proteins created from their gene, which had the antibiotic quality to kill pathogenic bacteria. In other words, flies do not only carry diseases but also possess cures. Among them, flies can produce antibiotic proteins that are hostile to pathogenic bacteria. Thus, what Muhammad said in the hadith was precisely reasonable. However, before the discovery of antibiotic activity in flies, it was widely argued among scientists whether or not the Prophet advised eating or drinking after dipping a fly into food or water.

When Muhammad talked about the wings of a fly, one of which brought disease and the other was a cure, there was no further report whether he told his companions to consume food or drink contaminated by the fly. Thus, every report of hadith must be analysed and checked of their authenticity, intention of the Prophet as well as the setting during the Prophet's speech or action. The fly case was a good example to show that those who held prejudice against the religion of Islam were always ready to negatively misinterpret the Prophet's sayings, claiming that the hadith was unscientific. Nevertheless, a number of researches conducted in the 20th Century on antibiotics found in flies began to clear the false claim of those scientists, but not before the Prophet received wide criticism. In fact, there are so many other contents of hadith related to science. It is even said that if Muhammad had not been born in 7th Century, science and technology development would be hundreds or even thousands of years slower.

تغير معظم العالم بموالد النبي محمد صلى الله عليه وسلم

"The world changed the most when Muhammad was born"

Above is the translation of an Arabic sentence by Dr. Arthur J. Arberry, of Oxford University, United Kingdom, who wrote it in a book published in 1964. The book also added that the most distinctive change was in science and technology. Thus, it is not an exaggeration to praise Muhammad as the world's greatest scientist when modern science had yet to emerge.

Chapter 17

Irrigation

In Arabic, the word for irrigation is *rai*. Irrigation is an administration of natural water sources for consumption, general use and agricultural crops. This work is both art and science. Humans have known irrigation since ancient times. Advanced nations around the Arabian Peninsula, including Assyria, Babylonia, Egypt, Greece and Persia, developed their irrigation systems thousands of years ago by building dams, dikes or canals to deliver water to and from the dam front or well to agricultural areas or communities.

Most of the Arabian Peninsula is covered with deserts, and the most important and needed resource is water. Thus, irrigation is a necessity. Arab people learned from surrounding civilizations to bring water from the oasis or other sources to their communities through a pipe system called qanat or sometimes faraj. They installed watertight concrete tubes beneath the sand's surface, slightly sloping from the source to the areas that needed water. The top of the tubes was dug sectionally for ease of care. When the water reached the end point, a water wheel called saqiya was pulled, usually by an animal, to fetch water into a wooden bucket. Besides water wheels, Arab people in Muhammad's time also had other water fetching technology such as shaduf, which was the simplest method. They placed two logs over a well and pulled or used an animal to pull water up with a bucket and rope. In addition, there was a device known as noria or na'ura, which lifted water. Similar to the water wheel, it was powered by water itself..

When Islam was introduced in the year 610, the water management process that had been used in Makkah became more necessary to separate pure water from the central water source. Muhammad taught Muslims to preserve clean water for wudu or partial ablution, which was a washing ritual to purify designated parts of the body, and ghusl or full ablution, which was performed to clean the entire body after sexual intercourse between a husband and wife, after menstruation ended or after lochia, following childbirth.

Water must be kept away from contamination of all kinds of najis or ritual impurity. Also, Muslims were advised not to use water that was exposed to the sun for a long period of time or that which was put in a rusty vessel. Therefore, water management was extremely significant to determine the amount and quality of water, which allowed Muslims to learn management and administration. During Makkah time, it was hard for Muslims to perform their religious practices because it could lead to violent confrontations with polytheist Makkans. Thus, they had to separate water little by little from the central source to their houses. However, Makkah had an advantage of possessing abundant water resources, including Zum Zum Well and others. With this advantage, it was easy for Makkah residents to find water, despite living in the desert.

During the 620s, starting from 622, believers of Islam migrated from Makkah to Madinah where there were relatively few sources of water. However, they did not have to hide when performing rituals because they comprised the majority of the city. Thus, water management was done more openly. But due to occasional lack of water in Madinah, Muhammad had to install the qanat pipe system to bring in water from sources outside the community and divert the water using the water wheel.



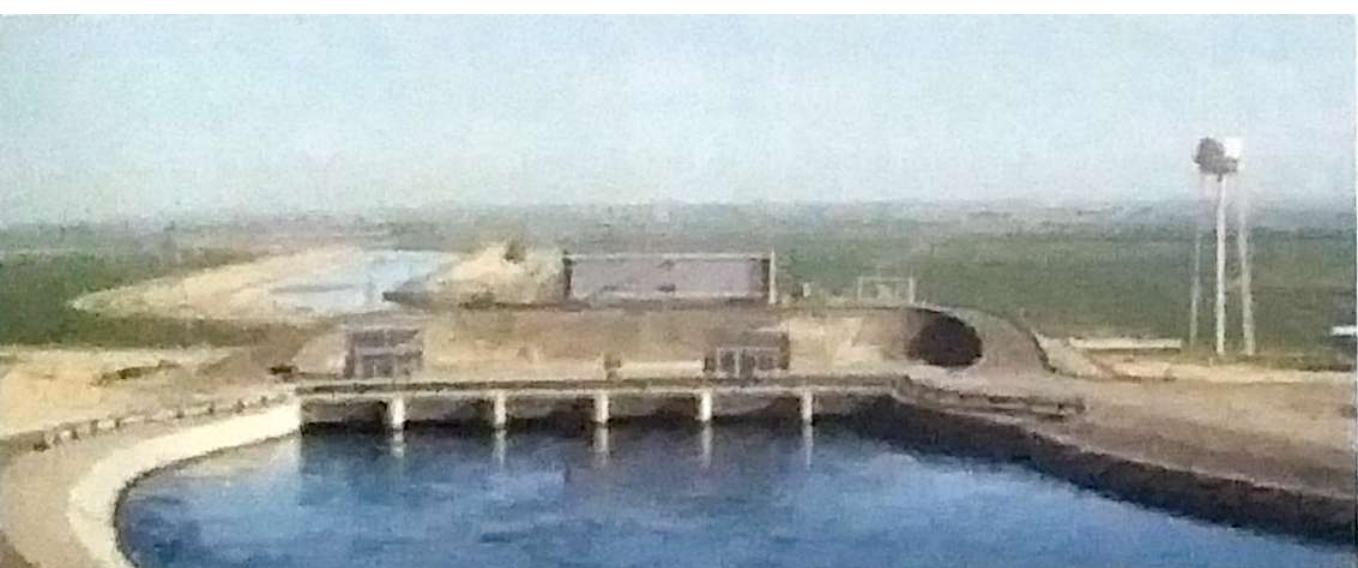
The most important factor that made Muhammad an irrigationist was his imposition of strict water use regulations to prevent fights over water resources. For instance, he declared that water belonged to everyone equally, whether they were Muslims or non-Muslims, and that no party could own a water source alone. Also, he initially forbade the selling of water left from use and stressed that it should be returned to the community. Additionally, many public water distribution points were built, which allowed access for everyone.

Secondly, the Prophet created regulations for sharing water equally with those in need as well as livestock. He divided the share into three groups based on needs in descending order, which included water for the community, special water sources for the community and for households. The sharing required a mutual agreement that no part of the community would be short in water for consumption, especially when in need.

Besides daily use for cleaning as well as performing religious practices, water resources were managed for irrigation or agricultural crops. Muhammad made sure every party received equal access to water. When it had to be shared, those who lived on higher grounds had the right to take the water first, to press it to flow down for others. However, due to occasional necessities, the regulations changed. Hearing the needs of the community and consultation with concerned parties were practiced, which altered the rules, depending on the case. Because of this, scholars of different schools of thoughts interpreted hadith related to water usage differently in some situations.

If a well or pipe was built by a person or group of people, Muhammad decided fairly that the builder should be the first to use water as much as they needed, but they had to share the rest with the community. With such leadership, the Prophet was like the governor of the city of Madinah. He was responsible for managing water resources and served as a leading figure in bringing water to the town. He sometimes had to do it himself, installing multiple, kilometres-long qanat pipe systems so that the community under his governance never lacked water.

When the community grew bigger, water management and administration became more complicated. Some families possessed more water than they needed. Nonetheless, they had the rights over the water because it was from their own efforts of digging the well and building the pipes. Thus, Muhammad permitted them to sell the rights of using water under the condition that sales for agricultural crops and livestock be prioritized.



Chapter 18

Trees

Muhammad was not only a theorist but also a practitioner, which was the quality that made him succeed in his missions. To be a practitioner, one must be hard working and never give up. These are also the qualities of all the great scientists in the world. Attesting that Muhammad was a scientist is a bold challenge because many understand that science focuses on researching, experimenting, testing, practicing, calculating and proving. However, Muhammad was known to be a curious individual who always presented his ideas through practice to prove what he thought. More importantly, his diligence was second to none. All of these qualities are required for one to be a scientist.

Muhammad was not a scientist as perceived in modern days but he was the type that built foundations for far more advanced science in the future. He urged people to get curious and learn new ways of thinking, which helped them bring their thoughts into daily practice. All the later leaders of the Muslim World followed his footsteps, providing support for scholars, which contributed to the development of basic sciences including mathematics, chemistry, biology and medicine. Consequently, the Muslim World turned into a source of learning as well as researching. The development that stemmed from Muhammad was notably crucial to build the society of wisdom, especially in science and in technology.



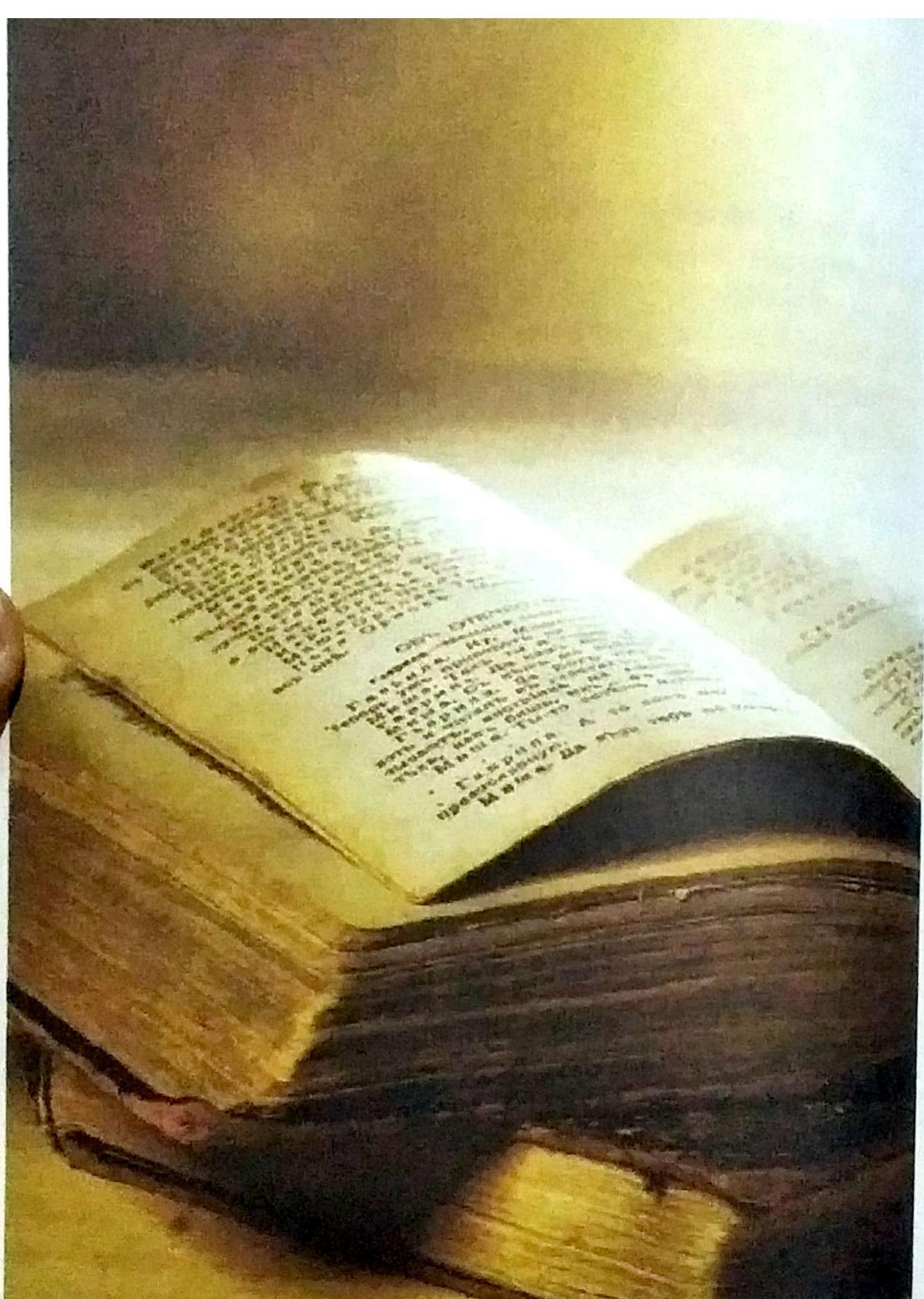
It can be said that one of the main factors that propelled the Arabs into a civilized society was their environmental works. Prophet Muhammad gave much attention to environmental preservation, and he personally put this belief into practice. When everyone saw the hands-on way in which he conducted himself, serving as a model for living, the Islamic World after Muhammad's era was one that prioritized the Prophet's environmental ethos. Many diverse peoples, including Arabs, Persians, Turks, Uzbeks, etc., all granted importance to the environment. It would not be inaccurate to say that the Prophet Muhammad was an environmentalist; let's further explore the Prophet's role in this context.

One of Muhammad's preferences was tree planting. He taught all Muslims to be dedicated and patient with planting, and also advised his people that even if they were at the last hour of the world, they should plant trees. Muhammad imposed that the area within a 19 kilometre range from Madinah's city centre should be forbidden land in which no animal hunting and tree cutting were allowed. He advised that if any of the townspeople cut a tree, he or she must plant at least one tree in return, particularly in the city park area. This was a reason why Madinah was greener than Makkah.

Muhammad told Madinah residents to plant trees for the benefit of animals such as birds and humans. He said that if a bird ate from the planted trees or neighbours benefited from such trees or their fruits, the ones who planted them were to receive merits. His love for trees was well known to people in Madinah. There is not any hadith narrating that the Prophet ever cut a tree. In contrary, he forbade deforestation, which covered the destruction of enemy farms during war. However, this ban had one exception; when there was a dispute between Madinah townspeople and the Jewish Banu Nadir tribe, Muhammad ordered the elimination of many large date trees that blocked sight from the city observation point. Besides preventing attacks from the Banu Nadir tribe, Muhammad gave orders to let the disputing tribe know that he was more willing to sacrifice the trees he loved than allowing the Jews to harm his townspeople.

Another environment-conscious trait of Muhammad was that he economized the use of water. He warned Muslims not to use water extravagantly even if it was for worshiping God, such as ablution, or even if the water was from a river or waterfall. Besides, the Prophet was frugal in his daily life, displayed in his wearing of old clothes. His wife Aishah said that her husband repaired and cleaned his own clothes so that they always looked new. He did not like to buy new clothes because that was extravagant to him.

The more obvious frugality of Muhammad concerned eating. Muhammad taught Muslims to eat a fair amount of food, which would make them full. He advised that the stomach be divided into three parts: one for food, one for water and one for empty space. In other words, this recommendation was intended for eating economically because it is essential to take care of the environment.



Chapter 19 Books

Having united the Arab people and many other desert tribes in the Arabian Peninsula into a monotheistic faith based on the Islamic religious belief in 630 A.D., Muhammad led his followers to perform hajj, his last and only hajj pilgrimage in Makkah. In his preaching at Arafat, an important place for the hajj rituals, the third Quranic verse of the fifth chapter: Al Maedah as compiled in the Holy Book was revealed to him.

الْيَوْمَ أَكْمَلْتُ لَكُمْ دِينَكُمْ وَأَنْعَمْتُ عَلَيْكُمْ نِعْمَةً وَرَضِيَتْ لَكُمُ الْإِسْلَامُ دِينًا

"This day I have perfected for you your religion and completely my favour on you and chosen for you Islam as a religion."

By the time of Muhammad's death in 632 A.D., the Quran had played a central role in Muslim life. Being a foundation of Islam, it is the final authority on all religious matters. Muhammad was a successful moral and social reformer. He created a new system of social framework for the life of many races in which women and lower class were much more honoured and cleanliness was regarded high on the list of priorities. By taking what was best in the uncivilized nomadic tribes and adapting it for settled communities, he established a religious and social security, which was a vast improvement on what went before. Madinah had been designated the first capital of the Islamic Empire since 622 A.D. In January 657 or Rajab 36 AH, Ali who was the fourth caliph or Muhammad's successor moved the capital city to Kufah, 1,500 kilometres north of Madinah.

Kufah was the capital city of the Muslim Empire for a short while when the Umayyad dynasty came to power and founded Damascus their capital. Damascus remained stable for almost a century and ended up with the rise of the Abbasid caliphate and foundation of Baghdad as the capital city of the empire in 750 A.D. Under the Abbasids, the empire had been largely recognized as the Islamic Golden Age. The scientific and technological fruition became a basis of the western and world development as seen today. There is no denying that Muhammad had initiated procedural reform in the Arabian Peninsula. He was regarded as the crucial factor in Arab and Muslim social developments.

Based on Muhammad's reforms in education, social administration, morality and hygiene, stimulating the development of Arab and Muslim civilization, other branches of knowledge and science as well as technology had been applied to developing society, which included irrigation, engineering, architecture and calligraphy. Furthermore, cultural diversity also played a major role in bringing about social development in the Muslim world.

As Muhammad accepted cultural diversity in the community, multiculturalism had been embraced since the early propagation of Islam. Under the rule of caliphs, a concern for justice, peace and genuine respect for people were regarded high on their list of priorities. Such a positive image and the prophetic traditions had attracted people of different races and backgrounds to gather in the Muslim empire. As a melting pot of experiences and thoughts, a new society as seen in the modern countries like the US had been built up to attract people from Europe and around the world.

As a new Muslim society that emerged as the clear favourite, education has been strongly supported since the beginning of Islam, for the first revelation that dawned on Muhammad started with the word iqra, which means "read". God repeats the word "read" three times then says that He the Almighty has taught mankind; taught what mankind knew not. God then focuses on the importance of the pen in the acquisition and spread of knowledge. Muhammad always encouraged Muslims to acquire knowledge as clear by his famous statements: "Seek knowledge even if it is in China"; "Seek knowledge from the cradle to the grave"; and "If anyone travels on a road in search of knowledge, God will cause him to travel on one of the roads of Paradise". Based on Muhammad's prophetic image, the Western people viewed his great efforts to create a glorious Muslim society, saying, "When a mountain does not come to Muhammad, he has to approach it".

According to education, Arabic had been regarded the official language of the empire as an impressive result of collecting and compiling the revelations into a complete book in the age of caliph Uthman, twenty years after the Prophet's death. When people from different races and backgrounds spoke the same language, they could exchange knowledge and experience with ease, apparently leading to rapid development in education. Soon Muslims embarked on translation of works into Arabic from Chinese, Indian, Greek, Raman, Egyptian, Persian, Babylonian, etc. The Arabic language is mentioned in the Quran, chapter 42 Ashura, the seventh verse:

وَكَذَلِكَ أَوْحَيْنَا إِلَيْكَ قُرْءَانًا عَرَبِيًّا

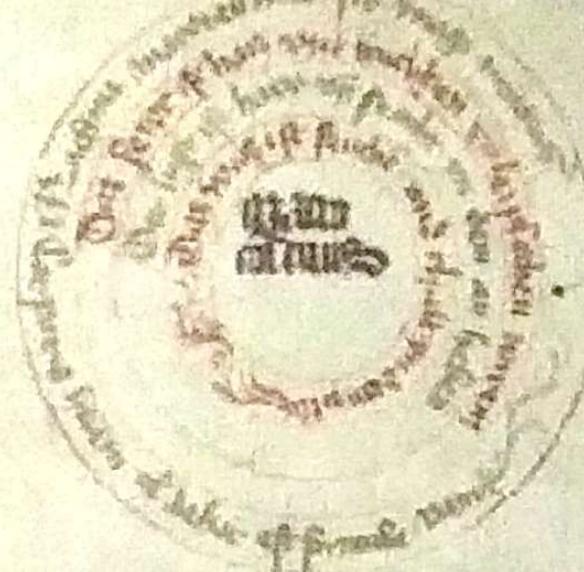
“And thus We have revealed to you an Arabic Quran...”

After two hundred years following Muhammad's death, there were no major advances in education because of a relative scarcity of social and other written records, regardless of some revelations and prophetic traditions written on leather, tablets, palm leaves as well as papyrus. In the Abbasid caliphate, paper was introduced to record instead of those materials. As a result, paper was initiatively made in Baghdad, hence supporting the highly advanced education in the entire empire.

Under the caliphate, the Muslim empire expanded into the Middle East, North Africa, Middle Asia, and parts of South Asia, and it stretched to Eastern Europe, covering 15 million square kilometres. Paper producers were found everywhere and writers, authors, distributors, translators, printers, bookstores, readers, book collectors as well as libraries emerged every place in the Muslim society of that time.

In the Abbasid caliphate, libraries played a major role in creating a smart society. In the capital city of Baghdad, there were more than 36 public libraries, each of which provided more than 60,000 books. Moreover, printers offered high quality paper and book bindings with covers made of leather. During the glorious time, even Muslims in the farthest town of Timbuktu in what is now Mali placed a high value on books. Sales of books had become one of the most significant trades. Muslims enjoyed reading and acquiring knowledge while Christian Europe was immersed in ages of darkness.

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i. d. d. das da fleisch von
seinen eisn schmieden
et ist er sterblich.



Philosophus docet
Inquit quid sit homo
Qui Quod natus quod sit
Inq[ui]s homo quid terraque
Act[us] p[ro]p[ter]e[us] dulcior, am[or] dul
ciu[m] m[er]itis, dulcior, p[ro]p[ter]e[us]
H[ab]em[us] autem quia m[er]ita legum, ius
h[ab]em[us]. Petebis[us] s[er]uibus uerbi
uul[er]is. Non sequitur res ipsa p[ro]p[ter]

Chapter 20

Gigantic Shoulders

“Nanos gigantum humeris insidentes” is in Latin and a metaphor of a dwarf standing on the shoulders of a giant; the bigger the giant is, the farther the dwarf can view, and that expresses the meaning of “discovering truth by building on the previous discoveries”. However, there are two important matters to be discussed; first, previous discovery must be acknowledged and second, later discovery must be open for further acquisition.

Modern branches of science have been discovered by building on the previous discoveries. The Arab people and Muslims are a good example, for they discovered scientific works during the 8th to 13th Centuries by building on the previous works of the ancient civilizations and disseminating their works to other people. Muslims produced a lot of scientific works, which have been recognized as a basis of the modern sciences. Sadly, their works are hardly referred to in the scientific research carried out by the western world. As a result, the younger generation does not have an opportunity to obtain information about Islam and science.

The younger generation, including Muslims, know a little that Muslims played an important role in later scientific development. Nevertheless, there are a number of well-known people in the western world who had a positive view on Muslim scientists.

John Davenport from Harvard Divinity School, Harvard University, Massachusetts, USA, wrote in his book of An Apology for Muhammad and the Koran in 1869 that:

"After Europe had been in a period of darkness for ages, Roger Bacon, a philosopher and friar, was born in 1214 in England and regarded as one of the earliest European advocates of the philosophical science. It was him who lit up and led Europe to the enlightenment or renaissance."

"Bacon had learnt Arabic together with Greek and Latin. He was so good at Arabic that he was able to comprehend and translate the scientific works into English. Among those Muslim scientists, he admired the work of Avicenna and regarded him as a Prince of Philosophy. Bacon was also regarded by the western world as a man of Baconian Philosophy System. He acquired knowledge from Ismael's descendant, Muhammad in particular and spread it throughout Europe. Muhammad was born as Europe was in the darkness. He was like a candle to light up Europe."

George Sarton was a Belgian chemist and historian who wrote a book entitled *Introduction to History of Science*, consisting of 4,296 pages and published during 1927 to 1948. His work stated that "the world scientific development was fostered and transmitted time to time. In the Muslim world, only a few decades after Muhammad's death, Muslims developed various intellectual concepts about knowledge, later known as a basis of scientific works. They acquired useful knowledge from ancient civilizations of Chinese, Mesopotamian, Persian, Greek, Roman and Egyptian, and translated the works into Arabic. A high educational institute namely 'House of Wisdom' was established to create a science society, apparently considered to have developed scientific works for more than 350 years."

In his work, Sarton divided the scientific achievements into volumes; each volume had a limited period. For example, between 500 to 450 B.C. was the period of Plato, followed by the period of Aristotle, Euclid, Archimedes and others respectively. From 750 to 1100 A.D. saw the Golden Age of the Islamic science and Muslim scientists from Jabir, Khwarizmi, Razi, Masudi, Abu I-Wafa and Biruni to Omar Khayyam. During 350 years, Muslim chemists, algebraists, mathematicians, doctors, physicians and astrologers within the Muslim-ruled areas had diverse ethnic backgrounds. They included Arabs, Turks, Afghans and Persians, together fostering scientific advances for the world.

Sarton continued that after 1100 A.D., the first scientist appeared in the western world as a result of the earlier transmission of the scientific works from the Muslim world. Although the world saw the rise of western science and the educational decline of the Muslim world during 1100 to 1350 A.D., Muslim scientists, including Ibn Rusd, Nasir-ud-din Tusi and Ibn Nafis, had played a prominent role in the world of science along with the western scientists. Years later, the scientific works in the Muslim world would declined considerably.

Professor Jim Khalili from University of Surrey, UK, wrote in his work of The First True Scientist in 2009 that, "Sir Isaac Newton is widely recognized as one of the most influential physicists of all time and a key figure in the scientific revolution. Known as the father of optics, his experimental works were related to lens and prisms, apart from the fact that Newton was a dwarf standing on shoulders of a giant who was a scientist born in 965

in what is now Iraq, 700 years before him. This scientist named Al Hassan al Haytham, also known as Alhazen had been hardly recognized by most people in the western world."

Isaac Newton (1642 - 1726) had a friend called Robert Hooke (1635 - 1703) who later became Newton's competitor. They had had a dispute over credit for their works until Hooke's death. Both scientists had considerable scientific works on optics and lens. When Hooke criticized some of Newton's ideas, Newton was so offended that he responded in a way that he was not a little dwarf on gigantic shoulders. Newton and Hooke had a remarkable exchange of letters until the latter died. Regretfully, neither of them acknowledged Alhazen's genius, representing the overwhelming influence on their works.



Chapter 21

Genius

I watched a documentary on the world's scientific development on the National Geographic channel. It said that one of the major factors to advance the branches of science was the dissemination of Muslim science and technology during the Islamic Golden Age throughout the western world. The dissemination took place when Europe was immersed in ages of darkness due to the wrong approach of the Church to science and knowledge, to the extent that any philosophical or scientific theory that contradicted to the official viewpoint of the Church was denounced as apostasy and the scholar was burned alive on the stake. The Muslim world, which was ruled by caliphs, experienced scientific, economic and cultural flourishing, and thus appeared as a shaft of light to Europe, marking the beginning of the Renaissance. Regretfully, the western world makes little reference to the scientific works of the Muslim world.

Regarding the close rapport between the western world and Muslim world, Muslims accept that Islam is a religion coming after Christianity, apart from the fact that the Quran mentions the existence of Jesus, known as Isa and considered to have been one of the major Islamic Prophets. Islam asserts that Muhammad is the Seal of the Prophets, sent to preach the Islamic faith on earth.

In chapter 21, Al Anbiya, the 107th Quranic verse states:

وَمَا أَنْتَ بِإِلَّا رَحْمَةً لِّلنَّاسِ ١٠٧

"We have sent you forth as nothing but mercy to people of the whole world."

However, the majority of Christians do not believe that Muhammad was designated as Isa's successor. Many of them also reject his prophethood. Despite their rejection, they welcomed Islamic science and technology flooding into Europe and hence advancing western science. However, there was a religious conflict between the Christians and Muslims that later led to the holy wars known as the Crusades.

"Crusade" is derived from the French meaning "raising the cross". A large number of crusaders were from France who called themselves "Frank". Muslims had seen the war as War of Cross, which continued for nearly two hundred years. There were nine major wars from the first launch officially marked by Pope Urban II in 1095 A.D. to the very last one in

Even after the long holy wars, Christian in Europe and Muslim in the Middle East continued to fight bloody battles until the 15th Century.

The ideological conflict caused a negative viewpoint on Islam in the western world. They have not recognized the science and technology developed in the Muslim world as a sound basis of social development in Europe. Based on the European ignorance of the Islamic role in modern science and technology, Prince Charles of the UK stated in 1993 that it was unfair to ignore the Islamic influence on modern science and technology.

The terrorist attacks on America on 11 September led to a growing conflict between Muslims and the western world. However, many western people turned to pay much more attention on acquiring knowledge about Islam and Muslims. Later, the Muslim discoveries of science and technology have been more accepted than ever.

The Quran as well as other written works related to Islam have also been significantly studied in the western world.

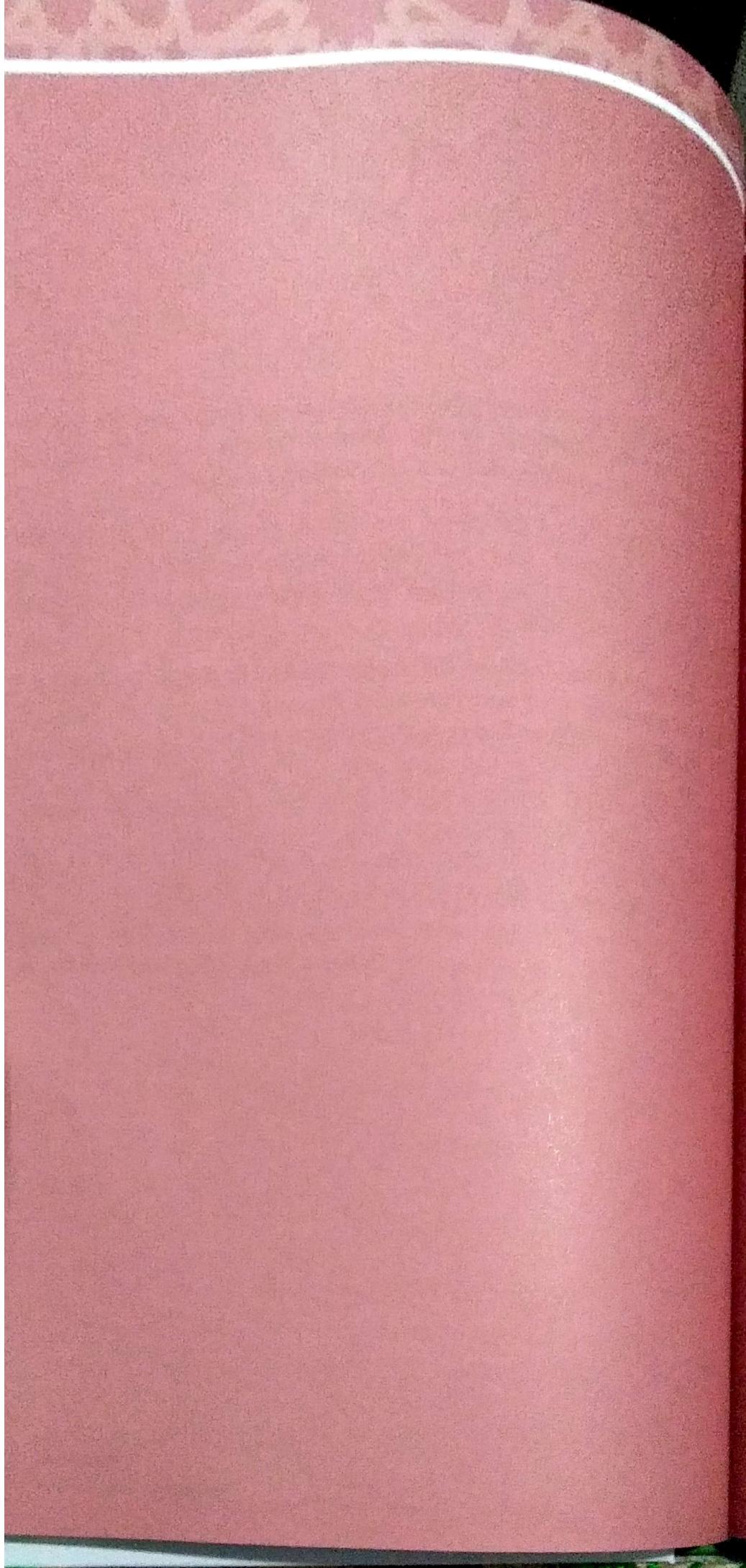
As previously mentioned, Islam emerged in the 7th Century in the Arabian Desert. Despite being surrounded by glorious civilizations, the Arab people lived in uncivilized conditions with ignorance of divine guidance. Muhammad spent 23 years on the Islamic propagation. During his preaching, he made significant changes in the society, bringing it from a low class tribe to a high level of developed community until the people were able to defeat the formerly glorious civilizations of Byzantine, Egypt and Persia within less than two hundred years. This considerable achievement has been regarded as an impressive result of Muhammad's reform.

There are a lot of well-known non-Muslims who have a positive view on the Prophet Muhammad, one of whom is the former Foreign Minister of France, namely Alphonse de Lamartine who stated in 1848: "If a man's genius can be measured by his objective, simple method and impressive result, there will be no one in the modern history to be compared with Muhammad". He did not exaggerate because Muhammad was sent to guide the Arabs whose belief was based on polytheism to worship only one God with his really simple method.

As a result, the Arabs were encouraged to develop themselves until they were able to rule the world at that time regardless of their considerable ignorance and lack of civilization before.

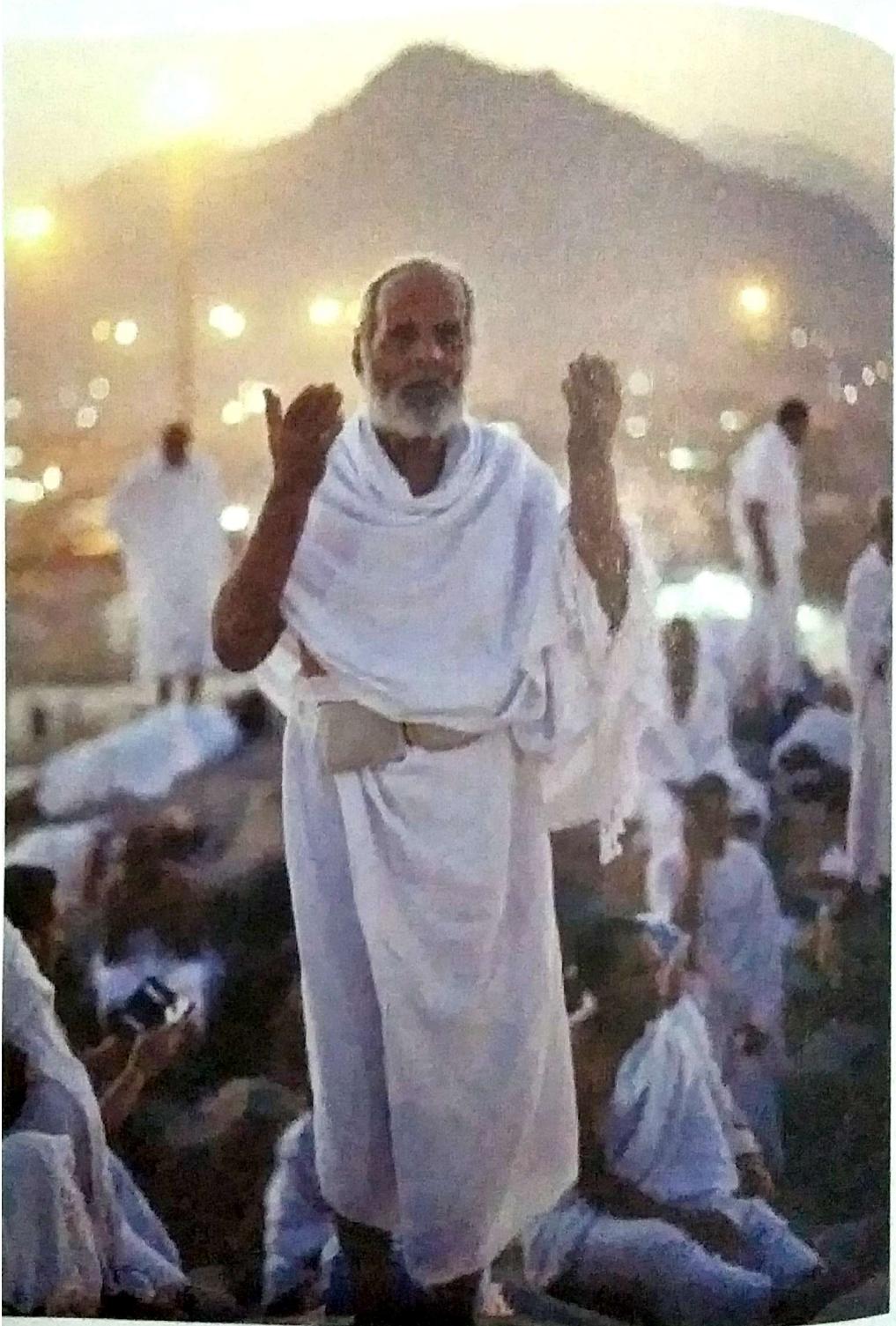
If asked about the simple method, the answer is that Muhammad adopted education and cleanliness to change the society by means of building love, confidence, discipline, vitality and respect – and all were concerned with social reforms.

Muhammad adopted the simple method to change Arab society. Water management was introduced to wash the body and maintain cleanliness. Irrigation and agriculture were placed on the list of priorities. The scientific works had been produced after years following the compilations of revelations and prophetic traditions, leading to a creation of the society of wisdom. Concerning these fruitful yields, it cannot be denied that the Prophet Muhammad had an influence on modern science and technology. He deserved to be among the world's scientists.





Muhammad: The World's Great Scientist
Part 2: His Influence on Medicine,
Nutrition and Halal



Muhammad
The World's Great Scientist

Chapter 1

Civilization

On 9 September 2014, as one of the members of the Central Islamic Committee of Thailand, I had been unanimously appointed president of the Mawlidin Nabi Celebration of Thailand 1436 AH in the meeting of the Central Islamic Committee of Thailand and seventy chairmen of the Provincial Islamic Committees across the country. The event would be organized during 7 to 9 March 2015, and Maha Vajiralongkorn, Crown Prince of Thailand, would be chairing the opening ceremony on 8 March 2015.

The reason why I mention the above is that I have got on well with the readers. I have contributed a number of articles to this publication for over twenty years - long enough for me to establish a friendly gesture of brotherhood. I also have the good intention to write about Mawlidin Nabi and his influence on nutrition and medical science that general people are not familiar with. I believe that this is useful because Islam has quite a lot to do with such fields.

Most of us may not be familiar with Mawlidin Nabi. Mawlid or Al Mawlid is an Arabic word that means birth. There are several Arabic terms with the meaning of birth but only two will be discussed: mawlid and melad. Melad is generally used to refer to birth. After one was born, he or she would celebrate his or her birthday. The Christians in the Arab world usually have Eid Melad or a birthday party.

Typically, Muslims hardly have birthday parties. They have just one day of birth so their birthday is called Mawlid without the Eid Melad or birthday party. The most important human birth for Muslims is the birth of Nabi Muhammad (SAW). Nabi is a person sent by God to mankind. The SAW stands for "sallallahu alaihi wasallam" that means "God bless him and Peace be upon him".

Love the Prophet, think of him. Although a birthday party is discouraged, many Muslims in several countries celebrate Muhammad's birthday. The event, organized in Thailand and some other countries, is called Mawlid whereas it is known as Eid Melad in the South Asian countries. The Mawlidin Nabi Celebration of Thailand has been considered the biggest Muslim feast. The feast can be traced back to the reign of King Rama V and it has become a traditional activity. Sheikhul Islam Office hosted it in the early days; however, the grand event has been lately held by the Central Islamic Committee of Thailand in collaboration with the provincial Islamic committees, government agencies and private sectors with the Sheikhul Islam chairing the ceremony.

The Mawlidin Nabi has become even more important for Thai Muslims when King Bhumibol Adulyadej presided over the ceremony in 1963, and in recent years, His Majesty's advocate Prince Vajiralongkorn has led the opening ceremony. Thus, it has become a symbolic event, representing the relationship between the royal families and Muslim people. Thai Muslims are so proud of the event that they organize such an activity in almost every province and mosque throughout the country.

In regards to the Mawlid of Muhammad, the importance of his birth is not to hold a birthday party but to commemorate him and his influences. The Mawlidin Nabi Celebration of Thailand is not exactly organized on his birthday of the 12th Rabi ul awwal, the third month in the Islamic calendar, as some countries celebrate the day right on the date. Therefore, the purpose of the traditional event that is held in Thailand is likelier to think of the Prophet than to celebrate his birthday.

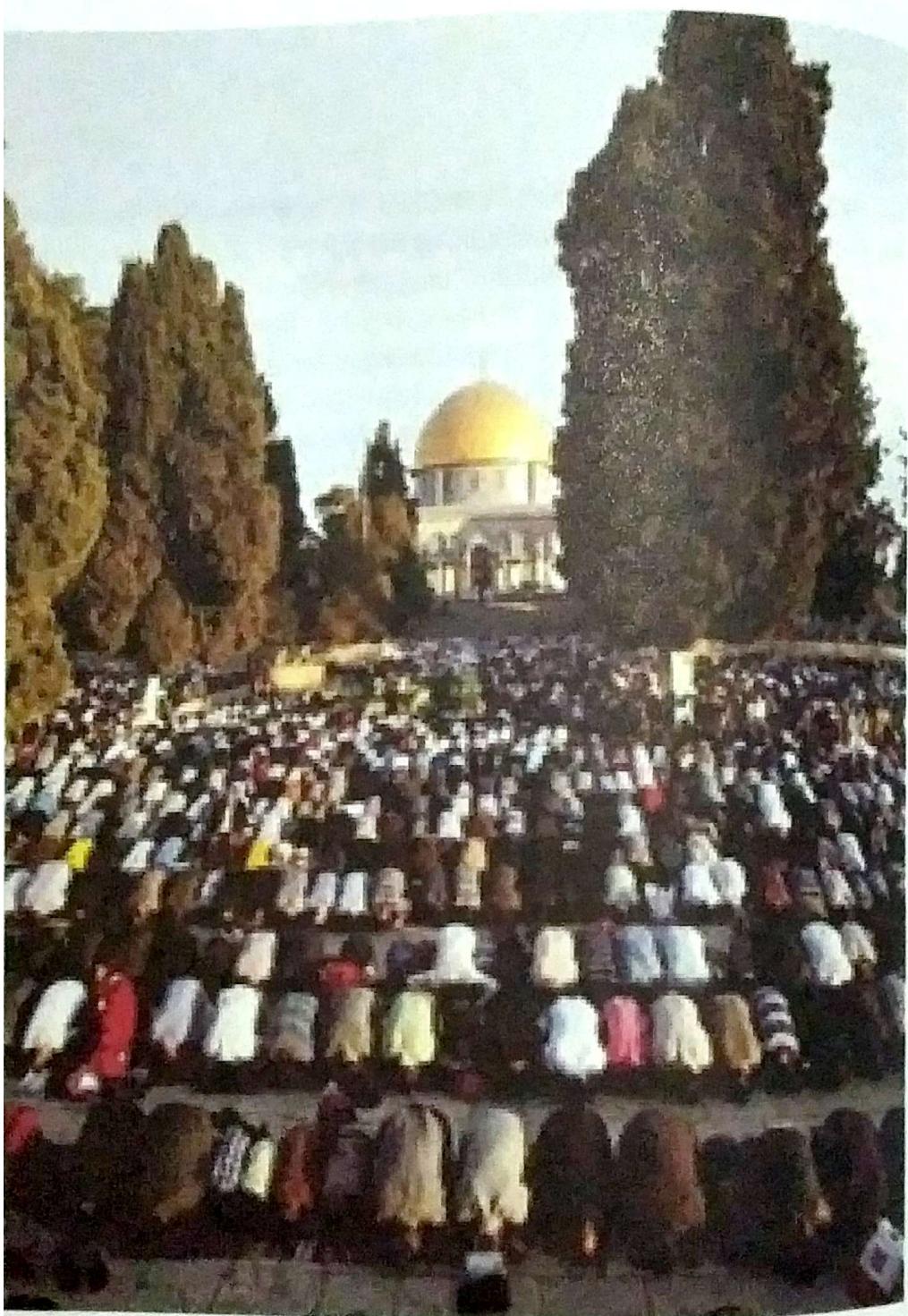
His influences on the world's development are always worthy of further consideration.

Before the birth of Muhammad or 1,400 years ago, the Arabian Peninsula was home to many Arab tribes. In Makkah where Muhammad was born, five or six native clans existed, but the most prominent one was Quraysh that the Prophet belonged to. Those Arab clans were uncivilized, compared to other groupings all around the Arabian Peninsula. They worshipped several collective idols in and around the Kaabah in the central city of Makkah, the present Saudi Arabia.

Surprisingly, the northern region, including the northeast and northwest, of the Arabian Peninsula was rich in civilizations. It was known as the Fertile Crescent that included the kingdom of Axum in the south or Abyssinia in Africa today. The Byzantine Empire reached out to Egypt; and the land in and around the Tigris and Euphrates rivers, as in the northeastern region in Persia or Iran, housed the Sassanid Empire. However, there was no influx of those great civilizations into the Arabian Peninsula. This was why the tribes in the Arabian Desert were called *Jahiliyyah* or ignorance of the divine guidance, referring to the allegedly barbaric condition in which the Arabs found themselves prior to the revelation of the Quran to Muhammad. They were not barbarians *per se* but people who had never been guided to the right path.

Muhammad was born in 571 A.D., a time of ignorant societies. Women were honoured less than men. Arabs were divided into a number of social classes. There was a lack of adequate sanitation. But after the propagation of the Islamic faith, the people who converted to Islam had significantly changed their living conditions from uncleanliness to hygienic practices. This is because Islam placed an emphasis on cleanliness as a part of the faith. Muslims are also urged on daily washing, especially conducting ablution before performing prayer twice a day in the early time.

The Prophet had faced considerable hardships as a result of his early propagation of Islam in Makkah. He eventually sought refuge from the intolerable pressure and persecution by migrating to the northern city of Yathrib or Madinah. There, the Arabian tribes were united into a single religious polity as Islam widely spread to the surrounding empires. Education, agriculture and governance had been developed, resulting in a gradual change from the uncivilized tribes to the hygienic Muslim communities, contributing a lot to a glorious and prosperous empire under the subsequence of two leaderships, with a vast expansion of Muslim power stretching to most areas in the world. It is fascinating how these stories emerge.



Muhammad
The World's Great Scientist

Chapter 2

Prayers

I have been asked by non-Muslim governors who belonged to a new generation about how Muhammad changed such Arabian tribes 1,400 years ago from an ignorant to a higher level of society with great potential to create their own civilization. Moreover, they were able to rule over the formerly civilized people without their fierce resistance. "Although the Islamic faith has played a crucial role in government, there had to be other means for achieving unity," added the askers.

There are quite complicated answers for such questions. Muhammad's charming personality was considered enormously important. He was a wise man with a highly psychological sociability. His truthfulness and generosity had been recognized for a long time. The former president Nelson Mandela said that people who used higher potential at work than ever needed great inspiration. The strong belief in Islam inspired the Arabian people at that time to make significant changes, yet the inspiration which was as an ideal procedure might not yield a fruitful result unless there was a joint consultative process.

Muhammad adopted his psychological approach to urge those Arab people on self-esteem and changes in awful conditions of uncleanness and disorder. As a result, they led a better life and appreciated the time value; consequently they could boost themselves and society by means of education and social discipline. The process of building up self-confidence and esteem brought about an intention to develop the society. The self-confidence as well as other practical examples of the Prophet was good encouragement that inspired the Arabs at that time.

Muhammad's personality had been acknowledged by the people in Makkah since he was young. His trustfulness and sincerity were well known. His success in commercial trade with his wife Khadijah, who was fifteen years older than him, could support the society. These were Muhammad's important principles before he was proclaimed as the Prophet in Islam.

An important incident that serves as a turning point of the Arab people was that when Muhammad was 40 on 21 Ramadan, the ninth month according to the Arabian calendar that was on 21 August in the year 610 A.D., he received Wahyu, the first revelation in the Cave of Hira on the mountain of Jabal Alnoor, three kilometres northeast of Makkah. In the month of Ramadan, occasionally Muhammad would retreat to the cave with clothes and some dried fruits for several nights of seclusion and prayer. During one such occasion, while he was in contemplation, the angel appeared to give him the first revelations from God.

Al-Quran is an Islamic book of collective revelations verbally revealed by Allah to Muhammad. Over a period of approximately 23 years of the Islamic propagation, several companions of Muhammad served as scribes, responsible for writing the revelations on paper, stone, wood, cloth and leather. The language of the Quran has been described as "rhyme prose". Its content is concerned with basic Islamic beliefs. Narratives of the early prophets, ethical and legal subjects, and historical events also appear in the Quran. Muhammad was illiterate. He was not a poet but a trustful man. Therefore, the Quran was proof of Muhammad's prophethood that a lot of people found their faith in Islam after they listened to a few of its verses.

Approximately thirty years after Muhammad's death, his followers (known as sohabah or companions in Islam) collected the verses and produced a hand-written manuscript of the complete book. The Quran consists of 114 chapters and 2,236 verses. The very first verses of the Quran to be revealed by Allah to Muhammad in the Cave of Hira are in chapter 96 with the title of Al Alak, meaning the blood clot, and it starts with ikra, meaning read. The followings are by the name of God who creates man from the blood clot, who teaches them by pen to know what they do not. The verses describe human prenatal development that the people of Muhammad's time have not known before. Islam emerged in the year 610 A.D. and started to emphasize the importance of education.

About 750 of the verses of the Quran in different chapters, or 12 per cent, are related to science and technology, astronomy, geology, sanitation, medication, food and nutrition, while the basic content is about history, law, government, faith and other religious performances. The Quran is therefore a guidebook sent from God to the Prophet to spread and make use. It is amazing to study how Muhammad introduced God's message to the people, as he had never received education systematically.

As education was emphasized, cleanliness was also a strategic plan to support social change surrounding the fact that the people lived in very poor conditions of uncleanliness with a distinct lack of sanitation. When their bodies were dirty, so were their hearts. The cleanliness that Muhammad introduced to his early companions was body washing, especially methods to perform ablution before offering prayers (Salat) to God.

Prayer has been an obligatory duty since the Islamic faith emerged in Makkah. The early prayer was performed individually twice a day at certain times: early morning before sunrise (Fajr) and late afternoon before sunset (Asr). The two prayers consisted of the repetition of two units called rakat, consisting of prescribed actions and words. The number of rakat in the early time differed from the year before Muhammad's migration to Madinah when a true method of offering prayers was sent down to him. Times were hard in the tenth year of the Islamic propagation as Muhammad lost his beloved wife and uncle almost at the same time; there were significant changes in offering prayers in terms of the prayer times and details.

In the tenth year of the Islamic propagation (620 A.D.), Muhammad took a long journey from Makkah to Jerusalem, ascended to heaven and returned to Makkah in a single night. The event was marked as a Night Journey (Isra and Miraj). As a result, he was ordered to conduct prayer five times a day. He then instructed the faithful followers the details of prayer; evening (Maghrib), afternoon (Dhuhr) and night (Isha) prayers were ordered to be performed in addition to the two prayers conducted before the event. There was no clear evidence about when Muslim started to perform the daily five time prayers - before or after the migration - but group prayers were clearly introduced in the first Islamic mosque built in the first year of the migration (Hijra).



Muhammad
The World's Great Scientist

Chapter 3

Water

During the early years of his prophethood, Muhammad preached Islam privately. At first, he did not face such stiff opposition from the people of Makkah because they had some consideration for his wife Khadijah and his uncle Abu Talib, who served as a clan leader of Banu Hasim. Later, as Muhammad was gaining new followers, they became much perturbed and their actions morphed into active persecution. As a minority, Muslims had been mistreated. The case reminded me of the problem in India that my friend told me a couple of years ago.

Muslims are the minority of the population in India, approximately 200 million or 15 per cent out of almost 1.3 billion Indian people. India ranks in second place as the world's most Muslim populated country, only after Indonesia, which is home to 210 million Muslims. On an occasional day, I was invited to the Indian Foreign Ministry in New Delhi. A senior Hindu officer told me that the number of Muslims in India might reach 220 million and make India the most Muslim populated country on earth, but I was not sure about that. However, it could be concluded that India has been home to a large number of the Muslim minority.

Regarding the religious conflict arising in India, especially between Hindus and Muslims who resorted to violence against each other, the problem had been cured and it became more tractable. As a result, the country has rapidly developed in recent years. In the neighbourhood of thirty years ago, there were violent conflicts between different ethnic and religious groups occurring in India. A film entitled *Slumdog Millionaire*, which was produced in 2008 and won seven Academy Awards, showed the serious violence between different religions as the protagonist's Muslim mother was hit to death by Hindus.

My friend who was studying in India during the outbreak of violence told me that if a strange man entered an aggressive Hindu community, his pants might be removed to see if his penis was circumcised or not. If it was, due to the ritually Islamic practice, he would be persecuted. The violent attack was not very different from that in the early time of Islam. However, 1,400 years ago in Makkah, a Muslim man did not undergo such violent persecution. Actually, he could be differentiated from non-Muslims by his appearance. New converts to Islam kept their bodies and clothes clean as well as imparting perfume to them, whereas the natives of Makkah were very dirty in that they hardly ever took a bath. Thus, Muslims were distinguished from non-Muslims by cleanliness.

During the first three years of his ministry, Muhammad preached Islam privately among his close relatives. After he made public his propagation of the Islamic faith, he met with vehement opposition from the wealthy and leading clans of Makkah. In the fourth year of Muhammad's prophethood, the opposition against Islam began to intensify. The arrival of the new faith made an important difference between the believers and non-believers. Observing cleanliness of the soul, clothes and surroundings is obligatory upon every Muslim as Muhammad taught his followers to wash their bodies of at least their hands, arms, legs, face, hair and ears. This body washing, known as a partial ablution (wudu) is necessarily performed before offering prayers to God twice a day as taught by Muhammad in his early preaching.

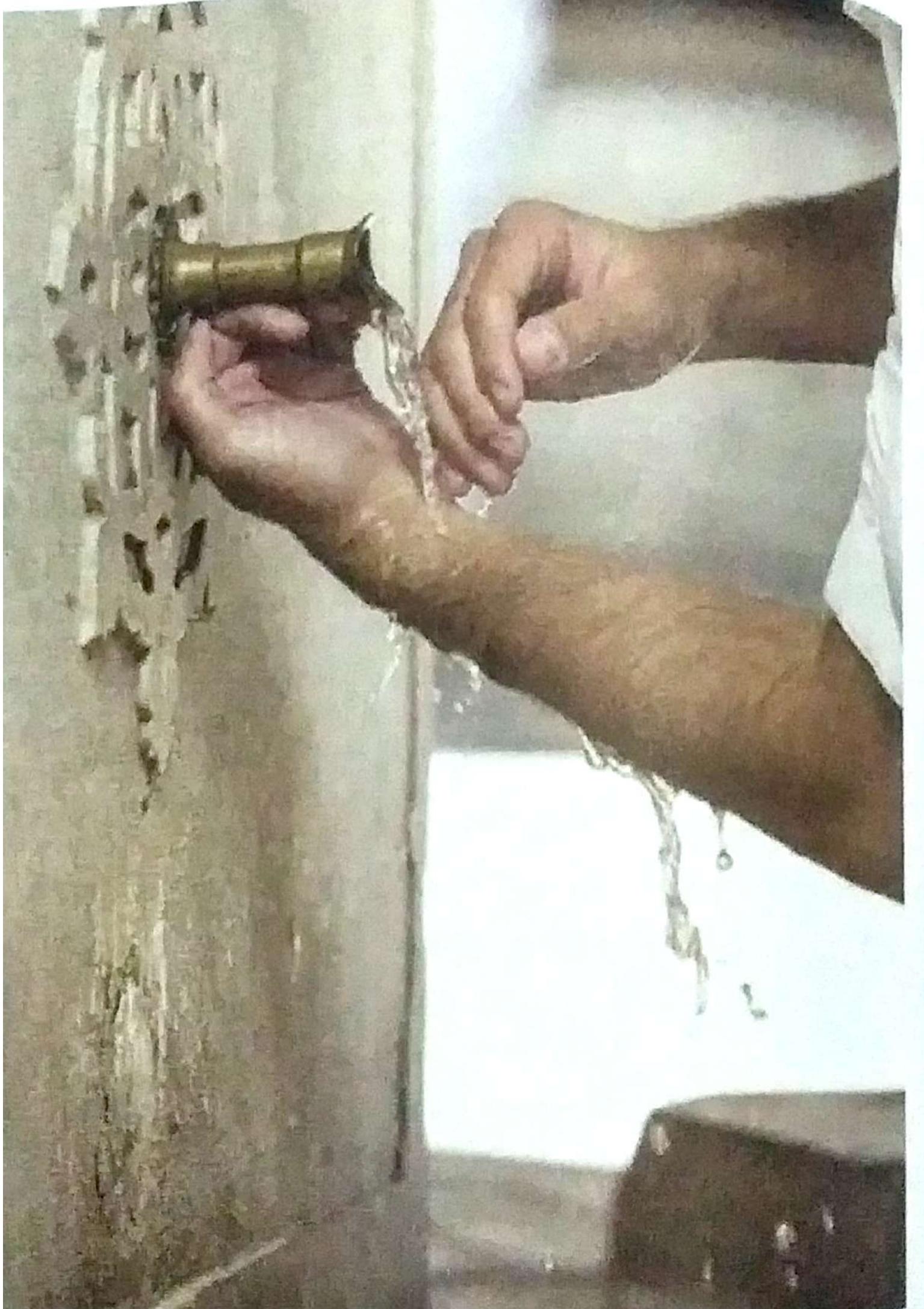
In addition, Islam recommended the full body washing - pouring water from head to leg - at least once a week, particularly on Friday morning. A full body washing ablution known as ghusl is mandatory for any adult Muslim after having sexual intercourse, completion of the menstrual cycle and giving birth. Muslims were encouraged to wash clothes, dress up with clean clothes, brush teeth, get a haircut, trim moustaches and beards, and shave the hairy parts and armpits. The state of cleanliness of bodies and clothes was considered as an essential aspect of Islam. Moreover, Muslims also kept calm and were generous, so they were different from the people of Makkah in general.

The central city of Makkah also housed the Kaabah and deities of Arabia's pagan tribes. Also, there was the big Zum Zum Well that provided an adequate supply of water for the local Arabs in Makkah. Muslims were among the groups using the water more than others. Regardless of the management method for consumption, the pure water had been carefully kept in order to wash uncleanness, which was known as najis in the Islamic context. According to Islam, najis are things regarded as ritually unclean, covering a wider range of the earlier defined uncleanness.

The unclean things are typically known as faeces, urine, lymph, pus, blood, waste, carrion as well as other dirt that Muslims necessarily wash off. However, the Islamic definition of the uncleanness is wider in range, including prohibited animals and animals either dedicated to other than Allah or undedicated. The unclean state also covers the spiritually unclean, which is known as yanabah or stainer, as referred to by Thai Muslims, due to sexual intercourse, menstrual period, bleeding after childbirth and contact with a dead body. These are regarded as physical uncleanness. Ghusl or washing the entire body is then required.

The ablution aims at offering prayers to Allah. However, it cannot be performed as the body is in the state of uncleanness. Water that is used to wash uncleanness or perform a full ablution must be purely clean. The water contaminated with uncleanness or cleanliness, such as herbs causing it change in colour, smell and taste, cannot be totally used for ablution. Pure water that was left under exposure of the sunlight until heated or water kept in a rusty container can be used, yet they are not recommended.

Muslims were recommended to manage water for general consumption and ritual ablution. The water management was an important strategy for Muslims to develop the science of hygiene that led to irrigation systems and agriculture. They built a system of water supply from suburban areas to the downtown. The strong faith in Islam of Muhammad's followers brought about a rapid change of the Arabian society from the ignorant tribes to the civilized communities, completely different not only from the natives of Makkah but also the local groups of Madinah.



Chapter 4

Cleanliness

Both Arabian and western academics call pre-Islamic Arabs *Jahiliyyah*, which means ignorant or stupid, referring to people who ignored the guidance from God. Simply living in an allegedly barbaric condition, they were not wild but such people who lacked the divine guidance. In Makkah, most local tribes turned to polytheism and idolatry and worshipped deities. A few settlers around the oasis of Zum Zum were monotheists of Christians and Jews or Judaists. These two groups did not mind the worship of several idols. As Muhammad preached monotheism, worshipping several idols was not allowed. This was then going against the traditional belief of *Jahiliyyah*.

Muhammad had launched his propagation publicly since 613 A.D. in Makkah and other neighbouring towns. Only a small number of the natives received his arrival, but mostly he met with fierce opposition. People who recently embraced Islam started to live in considerable hardship as a result of the opposition. At first, they had to conduct religious worship privately. Later, their strong belief demanded full action. Because Islam is tangible, the believers both in the past and the present can be distinguished from non-believers with ease.

The Arabian nomadic tribes used little water in daily life because of its scarcity in the dry Arabian Desert. Regardless of the abundant water supply via the renowned Zum Zum Well in the centre of Makkah, springs, oases and a reliable supply of water known as a qanat system, developed by the Persian people, used to transport water with a series of well-like vertical shafts connected by gently sloping tunnels, the natives used little water for body washing.

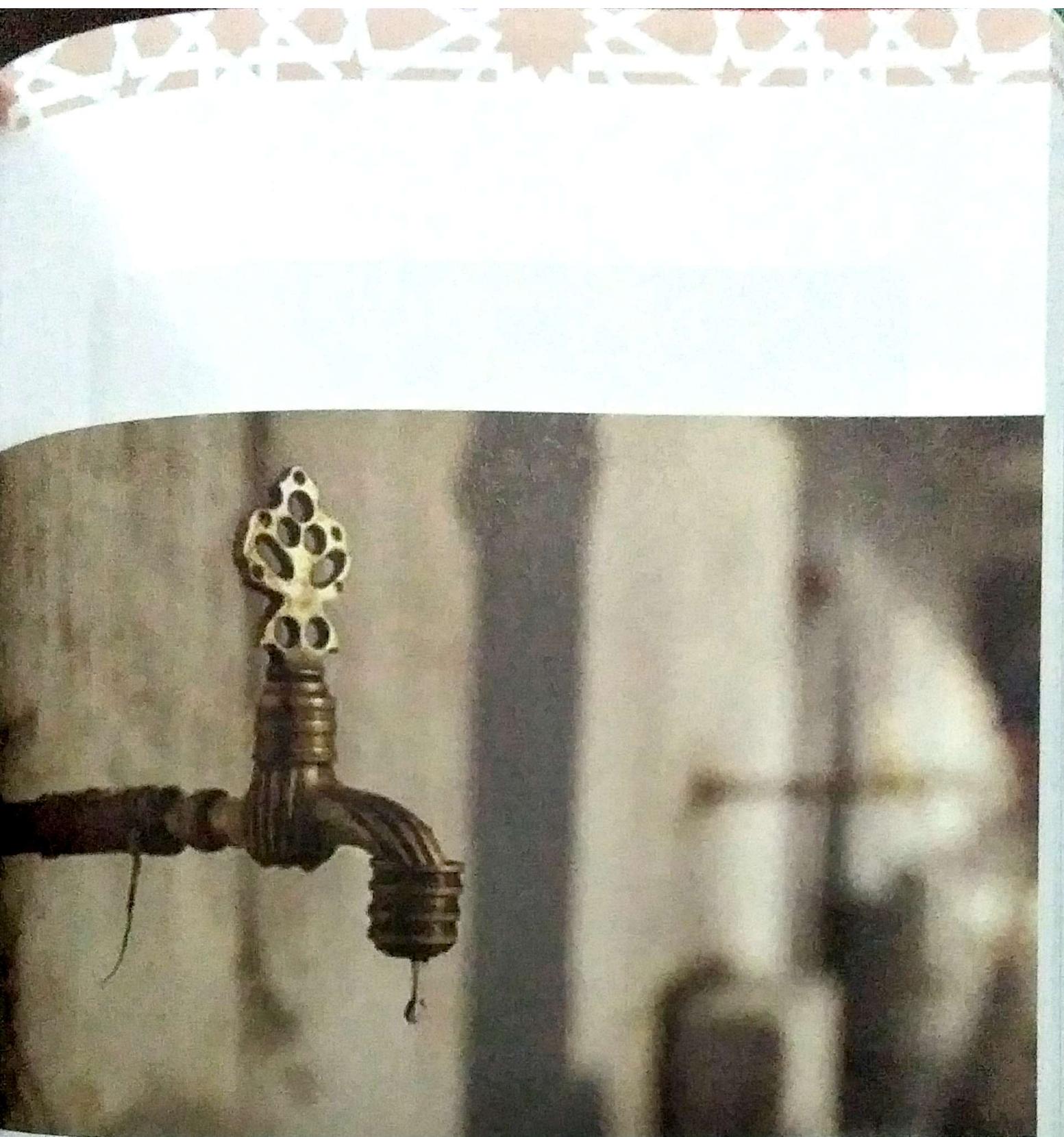
As mentioned, the Arabian people were less civilized compared to other groups in the north, south and east. In Makkah, many local tribes traded while others farmed. They were impolite and rude to other people, particularly those in lower classes or clans, including slaves and women -- even in their family. Burying baby girls alive and killing women to defend the honour had become normal among them.

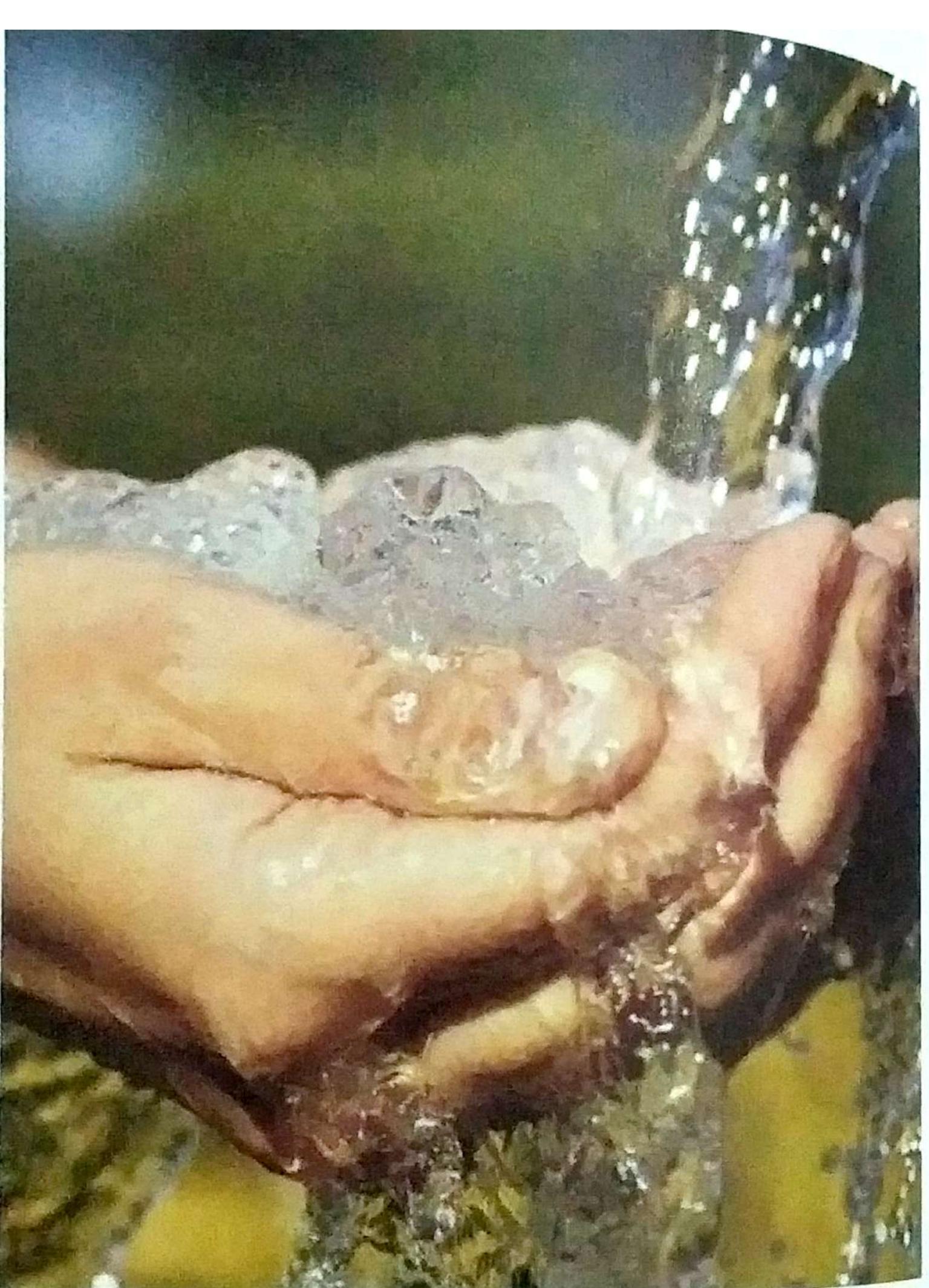
After the Islamic conversion, they were guided to cleanliness. Preaching the verses of the Quran relating to monotheism, Muhammad also introduced the existence of Allah to them by means of cleanliness. The Islamic believers had to perform a partial ablution before offering prayers or reading the Quran. Moreover, they were urged to conduct a full ablution or wash their bodies entirely for many occasions and activities, including ritual washing on Friday, and after sexual intercourse, menstruation and childbirth bleeding. Such ablutions made a distinct difference between the believers and non-believers. Muslims also paid respect to others, especially women. This was regarded as unusual and went against the local tradition. As a result, they had met with growing opposition and persecution. When the violence escalated into full-scale conflict, Muslims decided to leave Makkah to take refuge in southern and northern regions.

Cleanliness was a successful strategy implemented by Islam to reform the Arabian society. Al nazafah is an Arabic term referring to general cleanliness, body washing included, but taharah is used instead when it is ritually performed with intention, nyat, and specific water.

Water used for a higher level of cleanliness in taharah must be separated and well kept. The water cannot be used for such a purpose if contaminated with things making it change in colour, smell and taste, regardless of its cleanliness for consumption. Such water that was exposed to sunlight for a long time is not recommended to use because it is believed to be a cause of disease. Water in a rusty container cannot be used for taharah as well. The water management strategy for ritual cleanliness had drawn a lot of attention from the local residents that resulted in growing opposition and religious persecution. In 622 A.D., Muhammad secretly left his home in Makkah to immigrate to the northern town of Yathrib where Islam was much more welcomed.

Despite the location in the Arabia desert, Makkah had more adequate water from oases than the northern city of Yathrib, where water was scarcer. The latter had only one advantage over the former in a way that there was no vehement opposition and religious persecution. The local residents, especially Jews, did not go against the Islamic belief in one God as they had a sense of common identity, monotheism. Therefore, Muhammad could put an emphasis on cleanliness more effectively in the town. Cleanliness, then, became an important key to rename Yathrib Madinah after its rapid expansion.





Chapter 5

Administration

Islam adopted important strategic plans of cleanliness and water management to preach the faith. It is fascinating to see the Islamic law Shariah open its first chapter with how to use water for cleaning, and apparently this is an indication that Islam has always placed a strong emphasis on cleanliness as an important part of the faith.

1

Islamic scholars explained why Islam has placed such a strong emphasis on cleanliness. Firstly, Islam counts as a religion of nature, and the pure nature is always clean. This can be observed from either animals or plants trying to maintain environmental cleanliness in order to prevent themselves from damage. Many kinds of animals, such as cats and monkeys, like to keep their bodies clean, licking and grooming themselves or tending to each other. Similar to the animals, plants have a mechanism for dealing with the unclean environment, either getting rid of waste or containing the environmental problem. These indicate that cleanliness is a part of nature. And linked to nature, Islam has emphasized the importance of cleanliness.

2

Secondly, Islam regards cleanliness as its honour and prestige. Muslims must maintain the cleanliness to prevent them from being disparaged by non-believers. For this reason, mosques, housing and communities must be clean as it is clearly stated that cleanliness is a part of the Islamic faith. In other words, Muslims can demonstrate their strong faith through cleanliness.

3

Thirdly, Islam holds that cleanliness leads to personal hygiene, apparently resulting in a long and healthy life for paying homage to God. Therefore, Islam has focused on cleanliness to stay healthy. Muslims are encouraged to take a bath often, perform ritual ablutions, wash hands, brush teeth, trim hair and moustaches, clean the private parts, as well as keep clothes and residence clean to prevent a possible cause of disease.

4

Lastly, offering prayers to God gets started with cleanliness of the body and clothes. It is believed that God loves His faithful worshippers who maintain cleanliness. A Muslim has to wash his body entirely to get rid of all visible dirt, perform a ritual ablution to wash off all uncleanness in his heart and wear clean clothes before offering prayers to God. For this reason, he is in both physical and spiritual states of cleanliness while he is praying to Allah.

As Muhammad preached in Makkah, water was perfectly adequate for consumption and farming, particularly in the middle of the city where the Zum Zum Well was located. Supplying abundant water, the well had such a long history. According to the Islamic belief, it is a miraculously generated source of water from God, which began thousands of years ago when Abraham's infant son Ishmael was thirsty and kept crying for water. The well has supplied water for the local settlements in Makkah and the neighbourhood from the ancient time to the present.

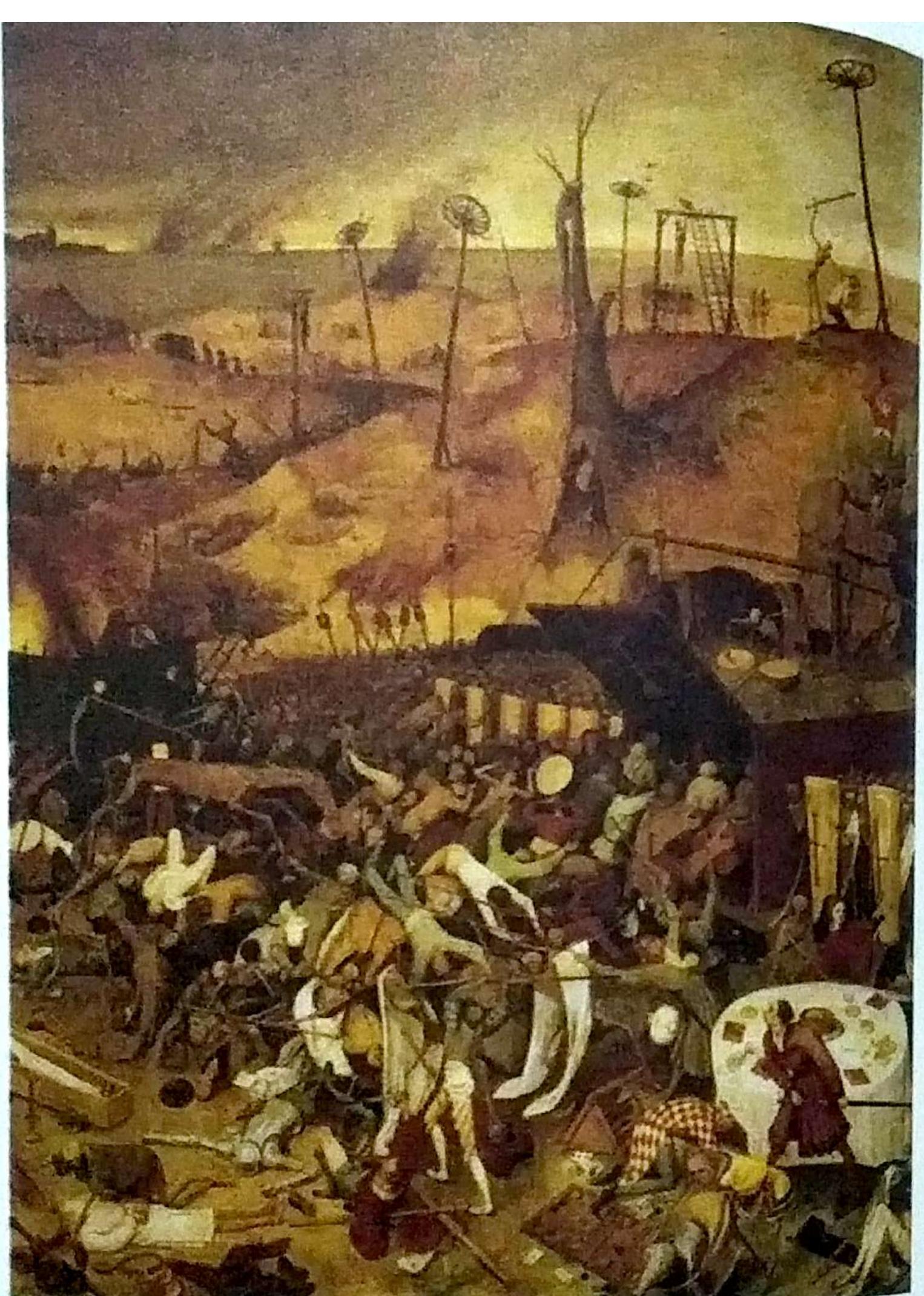
An ancient Persian technology called qanat was used to deliver large quantities of water from the Zum Zum Well to the neighbourhood or from suburban springs to the populated areas in Makkah. A qanat was a gently sloping underground channel, with a series of well-like vertical access shafts for maintenance. A mechanical device saqiya was also used to lift water from a well with a water wheel powered by animals.

In addition, a shaduf was an early irrigation tool, used by Egyptians to draw water, essentially using a bucket attached to a lever with a fulcrum fixed in the ground. A noria was another machine activated by water power and used for lifting water.

By that means of water supply, Makkah had never faced a water shortage. Unlike Makkah, Madinah did not provide a reliable source of water for the settlements. The Persian technology of the qanat system and other mechanical tools and devices of saqiya and noria had not been activated properly due to lack of good sources of water close by. Rich spring water, such as at Badr, was located 180 kilometres away from the city. For this reason, Muhammad spent years developing the city to be the centre of Islam. Under his effective water management, Muslims in Madinah, including the immigrants Muhajirun and the natives Ansar, gradually grew their settlements, boasting an abundance of water, compared to the scarcity before the arrival of Muhammad.

Under Muhammad's leadership, the water and other knowledge management methods later resulted in a number of Islamic specialists in agriculture and irrigation. Among those people, al-Ishbili, also known as Ibn al-Awwam, wrote a lengthy handbook on agriculture entitled in Arabic, *Kitab al-Filaha*. Although Ibn al-Awwam's book is primarily compiled from the writings of other authors, including those of Greek, Roman, Indian and Nabataean descent, as well as Muslims from Madinah, it is a compilation that is guided and informed by his own rich and non-bookish knowledge of the subject.

The arrival of Islam with an emphasis on cleanliness brought about the technological development in science of irrigation that later spread from old Islamic universities in Egypt, Algeria and Spain to Europe. A group of historians admired the Islamic Prophet, saying that if Muhammad had not been born, it would have been a thousand-year step backward for those recent scientific developments and modern medicine.



Chapter 6

Plague

As previously discussed, Islam adopted cleanliness as a strategic plan to grow the faith among believers, civilize ignorant Arabs and upgrade their culture and potential, as well as build love and confidence among themselves. As a result, they were able to rule over former civilized kingdoms. How did cleanliness support the early Muslim conquests? The paramount importance of cleanliness influencing the Arab world in the Prophet's time must be considered first. Meanwhile, we also need to understand the effect of uncleanliness on the Byzantine Empire under the reign of Justinian I The Great.

Five years before the birth of Muhammad in the Arabia desert city of Makkah, Justinian I, a Byzantine emperor, died in Constantinople, the capital city of the Byzantine Empire, located 3,800 kilometres northwest of Makkah. During the reign of Justinian, the empire reached its greatest extent and expanded into the northern Arabia peninsula, including Syria, Jordan, Lebanon, Palestine, Iraq, Anatolia, Egypt, North Africa, Morocco and Spain.

By the end of the 5th Century, the Western Roman Empire, which survived hundreds of year with Rome as the capital, collapsed as the Eastern Roman Empire continued to exist. In 527 A.D., Justinian became the sole sovereign. As a ruler, he showed much ambition to restore the Roman Empire to its former boundaries.

Justinian had waged a long war with the Eastern Empire of Sassanid, which was established in Persia. In 530 A.D., the Persian army was defeated, and the next year saw the defeat of Roman forces. He concluded this eternal peace, which cost him pounds of gold. Having thus secured his eastern frontier, Justinian turned his attention to the west, where several kingdoms had been established in the territories of the former Western Roman Empire. His attempts yielded successful restoration of the Roman conquest. Nevertheless, the Byzantine Empire had been weakened at a critical point, not by its vigorous rivals, but by a devastating pandemic known as the Black Death that killed millions of people in the Empire.

The Black Death is one of the most devastating pandemics in human history, resulting in the deaths of a hundred million people in Europe during the 14th Century, destroying one third of Europe's population. The plague of Justinian was a pandemic that affected the Byzantine Empire under the reign of Justinian I. The outbreak in Constantinople (modern day Istanbul) in 541 A.D. was thought to have been caused by the overcrowded and unclean environment in the city of the Middle Ages. The plague is an infectious disease that is caused by the bacteria *Yersinia pestis* in rats, which act as the host, while the oriental rat fleas that bites them being a prime vector of the disease. The plague can be spread by direct contact and it kills its victims within five days.

Before the outbreak of the plague, the Justinian forces succeeded in restoration of the Western Roman conquests. After the pandemic broke out, it spread from Egypt to Levant and various places of the Sassanid Empire in Persia. At its peak, the plague killed 10,000 people a day. The death toll was considerable huge in regards to the time.

The devastating plague lasted four month and destroyed almost half of the population in the Empire. However, it returned periodically in 558 A.D. When Muhammad was 12, he accompanied his uncle to trade in Syria, where the plague was killing a number of people. Muhammad learned the best way of approaching the plague was to migrate to safer places. At that time, there was no better approach in dealing with the disease than to escape from the epidemic. The plague's long-term effects on Constantinople's history might have been enormous. The pandemic weakened the Byzantine Empire, mainly its military and economy. Up to 645,000 military units had been recruited before the outbreak of the plague, but the number significantly fell to 150,000 units when the Empire was suffering from the outbreak.

As the Black Death returned periodically, the Islamic method of water management for ritual ablutions before offering prayers to God, consumption as well as cleaning clothes, living places and community spaces had prevented the spread of the pandemic to the Arabian peninsula, to great effect. Further, the Islamic expansion with the hygienic principle to the former colonial conquests of the Byzantine from Levant, Iraq to Egypt brought about a magical effect of containing the pandemic.

Muhammad repeatedly warned his followers against the threat of the plague. Seven years after the Prophet's death and under succession of Umar Ibn-Khattab, the caliph led his troops to contain the situation at the Syrian border where he found a serious outbreak of the epidemic. Immediately, he decided to pull out his forces. In Islamic history, during his withdrawal from the region, he met Abu Ubaidah ibn al-Jarrah, a commander of a large section of his army who was marching to support Umar.

The commander asked the caliph why he disobeyed God's will by calling back the troops. Umar responded that:

"I had followed the will of God by withdrawing my army from the epidemic as the Prophet warned before." Regardless of the caliph's warning, Ubaidah insisted on his marching. As a result, up to 25,000 people, including the commander himself, died by the cause of the epidemic. It was the first and serious epidemic in Muslim history -- and an important lesson for the Islamic Empire to put a stronger emphasis on water management and cleanliness to prevent the return of the disease.

UAR

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100 piastres



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الإمارات العربية المتحدة

Chapter 7

Imam Bukhari

The Arabs in the Arabian Desert were not that wild 1,400 years ago. Being in an allegedly barbaric condition, they still kept in contact with the northern and southern civilizations through commercial trade. For the medieval Islamic scholars, those tribal Arabs were people who simply ignored the divine guidance. They paid homage to several idols and deities around the Kaabah in Makkah, unlike Jews and Christians whose beliefs were based on monotheism.

The propagation based on monotheism launched by Muhammad took thirteen years in Makkah, with undesirable effects. Less than 200 people embraced Islam, 100 of whom fled from escalating persecution in Makkah to the southern Kingdom of Abyssinia. The rest followed Muhammad's migration to the northern city of Yathrib or Madinah. Muslims who migrated from Makkah to Madinah were known as muhajirun or migrants, as the local Muslims in Madinah were called ansar or helpers who significantly increased in number and became an important support for the Islamic expansion.

A part of the early Islamic success was the traditional practices of Muhammad as guidance for Muslims in his time as well as during the first three generations or about three hundred years after his death. The period after the Prophet's time was called Salaf or ancestors, and the time after it was named Kalaf. Sunnah encompasses all traditions and practices of the Prophet Muhammad, including his deeds, sayings, ideas, permissions and disapprovals that have become the models to be followed by Muslims of the first and younger generations. Along with the Quran, the sunnah makes up the two primary sources of Islamic theology and law.

Muhammad's traditions and practices were carefully recorded, namely hadith, an Arabic term meaning narrative, report or account. The hadith record had been carried out by his wives, companions or anyone who were in society after Muhammad's death, based on a chain of narrators reporting the hadith. The record might be in a formal writing or memorized report and classified as "authentic" (sahih), "good" (hasan) and "weak" (da'if), which was argued and categorized based on reliability. Mawdu referred to a hadith that had been fabricated and wrongly ascribed to Muhammad.

The record of sunnah in a collection of hadith reports was conducted in Muhammad's time but the book record was initiated under the successor of Abu Bakr, the first caliph with his supporter of Umar ibn-Kattab, who succeeded Abu Bakr to collect the book in one volume of the Quran and hadith so that they could be preserved. Therefore, Umar has been considered one of the most important caliphs for the Quran and hadith compilations. Another important Muhammad companion was Uthman ibn Affan, who succeeded Umar and became the third caliph, twelve years after Muhammad's death. His prominent work was to collect different copies of the revelations, namely Mushaf and prepare a standard copy of the Quran. Thus, the Quran was committed to the traditional written form. The present form of the Quran text, accepting the original version, contains 114 chapters and 6,236 verses.

Apart from the Quran, both Umar and Uthman also urged the hadith compilation, which are accounts of the verbal and physical teachings and traditions of Muhammad. As a result, the correct procedure for compiling the Quranic verses and collecting hadith reports had been a popular science, believed to be the scientific model for the early Muslims to open up a whole new field of research particularly relating to astronomy, science and technology. The hadith collections have supported Muhammad to become the man with the most biographical records in the world.

There is a major disagreement on the hadith between Sunni Islam, which is by far the largest denomination of Islam, and Shia Islam, which follows Muhammad's family and descendants and strongly holds that Muhammad's proper successor as caliph was his son-in-law and cousin Ali ibn Abi Talib. Most of the canonical hadith collections held in the Muslim world today are based on the books of hadith from the Sunni branch of Islam. Many scholars have been well known because of their hadith collections. Three hundred years after Muhammad's death, the hadith study and collection still proceed.

Imam al-Bukhari has been highly recognized for his hadith collection work, namely Sahih al-Bukhari or authentic hadith book. A Persian born in the Central Asia in 810 A.D., 178 years after the Prophet's death, he began to study and memorize the hadith collections. In 827 A.D., he could memorize up to seventy thousand of the traditions, and in 832 A.D., he travelled widely throughout the Abbasid Empire from Bukhara in present-day Uzbekistan to study in Madinah and Makkah. Al-Bukhari spent 16 years in the Arabian Peninsula, collecting those spreading 300,000 traditions. He also drew up his collection of 7,275 tested traditions, arranged in chapter form.

In addition, he authored nine hadith collections, regarded by Sunni Muslims as the most authentic of all hadith compilations. The number of hadith in his book, the sahih, is 7,275 hadith, including hadith occurring repeatedly. It has been said that this number, excluding repeated hadith, is 2,602 collections in his sahih. Sunni Muslims view this Sahih al-Bukhari as one of the most trusted collections of hadith. In some circles, it is considered the most authentic book after the Quran. Along with Al-Bukhari, there are four important hadith collectors: Imam Muslim, collecting 9,200 traditions; Abu Dawood, collecting 4,800 traditions; Al-Tarmidhi, collecting 3,956 traditions; and Al-Nasa'i, collecting 5,270 traditions. Moreover, there are other authors compiling authentic traditions in several books of hadith collections.

The number of hadith with low authenticity would be a large pile if typed in paper. Muslims and non-Muslims have acknowledged the prophetic traditions, including sayings, practices and travel accounts. Those hadith records have been considered, studied and interpreted by the younger generation, one of whom was Wali Abu Hendi, a psychiatrist from Zagazig University in Egypt who produced an interesting book on the Islamic Prophet Muhammad's accounts of nutrition and medication.



Chapter 8

Nutrition

Wali Abu Hendi, an Egyptian doctor who was specialized in psychology, wrote several books on physical health. He also had a nutrition counselling clinic for people who either needed to gain or lose weight. His interesting work on nutrition and medication was helpful advice on how to stay healthy according to the Prophet Muhammad.

Based on nutritionists, food is essential to life, providing nutrients, bringing pleasure, curing illness and preventing diseases. Therefore, food serves useful functions for healthcare in terms of promotion, protection, therapy and rehabilitation, covering three principle healthy elements of the body, mind and environment or society. The forth element of a spiritual base, as redefined by the World Health Organization, was excluded. Based on the traditional outlook of the Islamic Prophet Muhammad on healthcare, food also serves a spiritual context with a strong emphasis on worshipping God.

Based on the prophetic traditions known as sunnah, Abu Hendi informed that Muhammad regarded food consumption as a part of God worship. It was not in an offering form, but obeying the Islamic law. Muhammad consumed lawful and wholesome food as guided in the Quran, known as halal and tayyib without contamination of unclean najis and unlawful haram according to the Islamic aspect.

Not only following God's order to show his loyalty, Muhammad also performed more than that to make sure that his followers do not consume doubtful food. The prophetic tradition was reported in the hadith collections of Imam Bukhari and Imam Muslim as follows.

On the authority, Abi Abdillah al-Nu'man ibn Basheer said: "I heard the Messenger of Allah (peace be upon him) say, 'That which is lawful is clear and that which is unlawful is clear and between the two of them are doubtful (or ambiguous) matters about which not many people are knowledgeable. Thus, he who avoids these doubtful matters certainly clears himself in regard to his religion and his honour. But he who falls into the doubtful matters falls into that which is unlawful like the shepherd who pastures around a sanctuary, all but grazing therein'."

The Messenger continued:

"Verily every king has a sanctuary and Allah's sanctuary is His prohibition. In the body there is a morsel of flesh, which, if it be sound, all the body is sound and which, if it diseased, all the body is diseased. This part of the body is the heart."

The unlawful food is, therefore, an important matter. The doubtful, if it is lawful or unlawful, is known in Arabic as mashbooh or shubhah. A lot of food has been set in this category that many people do not know about. Thus, Muhammad warned his followers to avoid getting close to them. His warning against the doubtful matter has eventually become an important key for the management of standard halal in the present, which will be discussed in detail later.

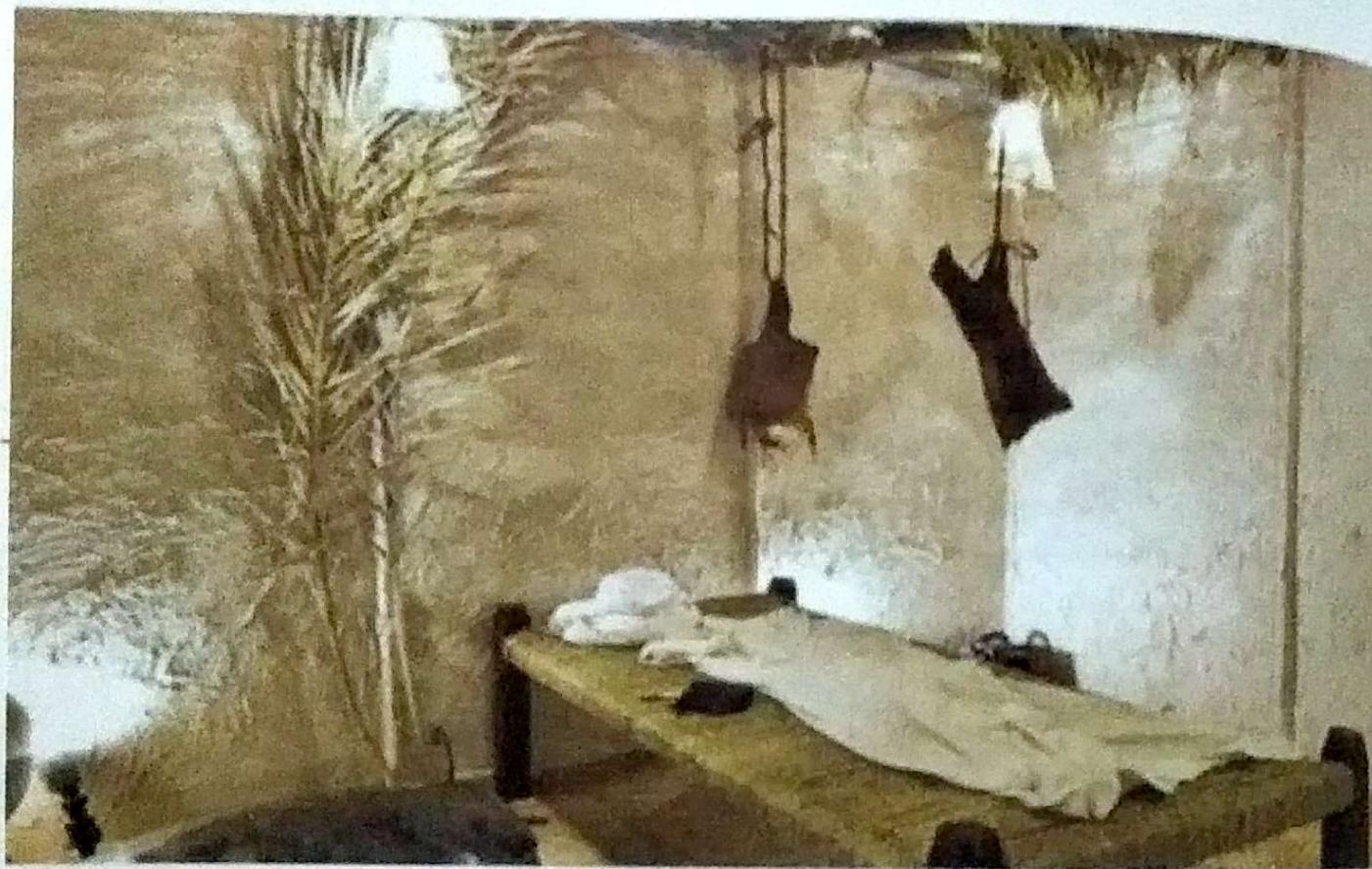
In regards to spiritual ablution, before eating food, Muhammad always washed his right hand, brushed his teeth and performed a partial ablution, as if he would be offering prayers to God. This ritual ablution was regarded as washing both the body and heart at the same time. However, Muhammad did not advise his companions to follow his tradition, saying if it was not too hard for them, he would urge them to brush their teeth before offering prayers. As a result, brushing teeth before offering prayers and eating food as well as performing a partial ablution before meals were regarded as his personal traditions.

In his research, Abu Hendi found that the Prophet Muhammad spent a short time, about twenty minutes, on eating food. Including his practices before eating, he took less than thirty minutes to finish his meal. When eating, he focused on his meal. Other activities such as chatting, consulting or reading were not recommended while eating. Based on this prophetic tradition, Abu Hendi advised the younger generation who want to keep fit and stay healthy to stop doing other activities while eating, such as walking, chatting, reading, watching TV, telephoning and using the Internet. They were advised to have a seat and eat until they were finished.

The Prophet Muhammad had held twelve traditional practices, which were passed to Ali ibnu Abu Talib, his son-in-law and the third caliph in the Islamic history, saying that the first four covered duties, the second four were the prophetic traditions and the third four constituted etiquette. The duties that were strongly recommended were: (1) halal food and its source must be halal; (2) starting with the name of Allah before eating; (3) thanking Him for food provision; and (4) concentrating on eating.

Other prophetic traditions, which are recommended, are not essential; fulfilment of which is rewarded though they may be neglected with punishment, including: (1) sitting on the left leg with the right knee lifted upright; (2) eating with three fingers; (3) eating from what is in the front; and (4) licking fingers before wiping them. Another four prescribed pieces of Islamic etiquette include: (1) eating with a small bite; (2) chewing properly; (3) avoiding looking at others as they are eating; and (4) washing the hand after eating. The Prophet Muhammad also always washed his hands before eating.

Additionally, Muhammad recommended that his companions not refrain from one of the three daily meals, except during the fasting month, to lose weight, reasoning that the body would need even more food that eventually caused weight gain.



Chapter 9

Manners

I would like to write a little bit about the Prophet Muhammad's house. In 63 years of his lifetime, Muhammad moved many times. His first house was the house of his father, who had passed away when the Prophet was still in his mother's womb. Muhammad lived in this house with his mother until he was six years old. When his mother passed away, he moved to live with his uncle, who was a merchant, for 17 years. As 1,400 years have passed, those three houses no longer exist. One house that can still be seen in Makkah is the house of Khadijah bintu Khuwaylid, a wife of Muhammad who he had been married to for 28 years. Because of her wealth, this abode was considered a large house for people at that time. However, it is not big at all when compare to the houses of millionaires today.

The only valuable property that Prophet Muhammad had in his house was his bed. Once Umar ibn khattab paid him a visit and when he saw the Prophet's living conditions, he broke down in tears. Muhammad was wondering why Umar, who was such a strong man, would cry like that. Umar said that he had never thought the governor of Madinah like Muhammad, who can order his followers to build mansions or even a palace, would live such a simple life as this. Braided ropes on the Prophet's bed left marks all over his back. This shows the austerity of one of the greatest and most influential men on earth, Muhammad.

Let's re-visit the eating manners of Muhammad. From a report of the research of Dr. Wail Abu Hendi, he concluded that Muhammad would sit on the floor every time he ate his food. There are three positions of his sitting. The most used position is called al-ikaa. Al-ikaa is the position where one lifts up the right knee and folds back the left leg until the knee touches the ground then one sits on the left heel. The left hand is placed on the floor, while the right elbow is placed on the right knee. Also, the right hand is used to eat food. Sometimes, the Prophet switched by lifting up the left knee. He always used this position until it became one of his distinctive characteristics.

The second position is called Al-tawarruk. One can make this position by folding back both legs on the floor and sitting on the back of the feet. The third position is called Al-kurfusaa. To do this position, lift up both knees, as the feet are on the floor, and lift the bottom up a little bit and then hold either arm on the knee. People with big bellies cannot do this, so it is clear that Muhammad had a flat stomach. A report said that Muhammad sat in this position while he was eating dates alone. However, when he sat with others, he often sat in the first two aforementioned positions.



The sitting position of Muhammad can lead to the suggestion for weight loss in two ways. Firstly, before eating, Muhammad would sit in his most comfortable position and he would never change until he finished eating 20 or 30 minutes later. Secondly, he never leaned back on the wall or the chair while eating. He also stretched his back as straight as possible. A straightened back is now proved to be good for health. Doing this while eating will help an individual feel full faster than eating in a comfortable and relaxing way, such as leaning backwards.

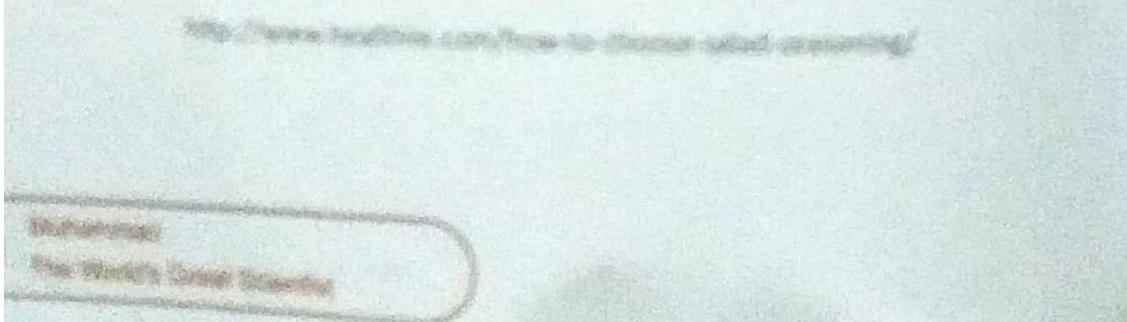
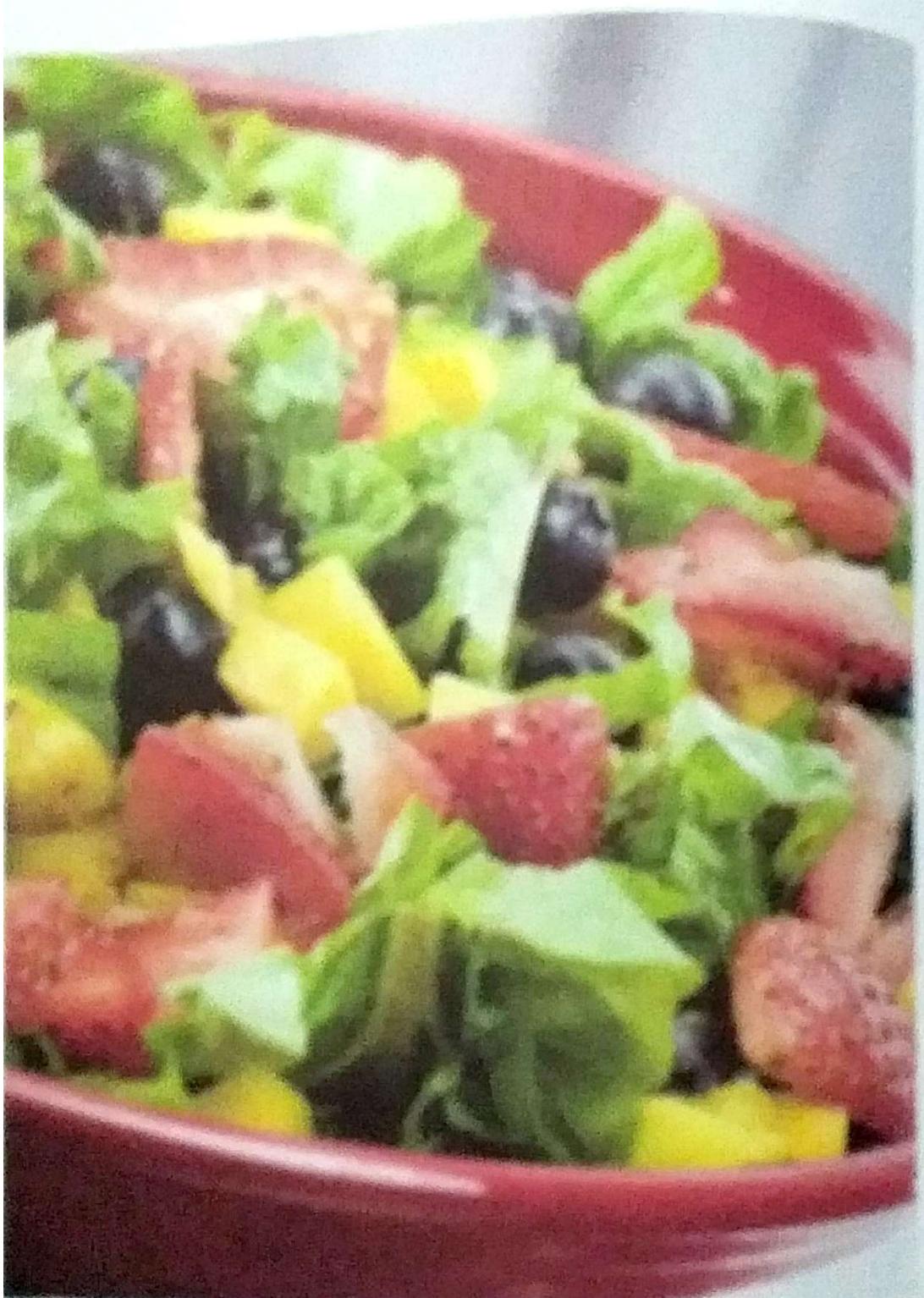
The quantity of the food one eats is also very important for good health. Siting upright will help one get full faster, and using only three fingers of the right hand to hold food except for the peeling of fruit or other activities can actually limit the quantity of one's food intake. It is better than the use of forks, spoons, or knives like today. Moreover, the Prophet Muhammad suggested that his followers eat only one-third of the capacity of the stomach, save one-third for water and leave one-third empty. All of these practices will help reduce energy intake in the human body; as a result, they will definitely help maintain a good body weight.

Another personality trait that kept the Prophet Muhammad healthy was chewing food. He used three fingers when eating and this limited the amount of food he took. Then he would chew food slowly and thoroughly before swallowing it. He ate one bite at a time, and he never rushed when it came to eating food.

Modern nutritionists place importance on chewing food. The process of chewing food helps the body expend energy. To chew food longer will help the body get full faster than normal. The food that has been chewed thoroughly can also prevent constipation. Some nutritionists recommend that people to count the number of times they chew. In the early 20th Century, which was the time of King Edward VII, a leading nutritionist, Mr. Horace Fletcher, introduced a technique called the "Chew Chew Diet". This diet style requires a person to chew 32 times before swallowing the food. Some groups of Japanese monks recommend chewing 50 times before swallowing. However, Prophet Muhammad did not count his exact number of chews; thorough chewing of food was simply one of his personal traits.

Another personality of Muhammad was that when eating, he would never talk and look at others much as he realized that they might feel uncomfortable. This is considered a manner of eating, too. Another important manner I would like to mention is that Muhammad always sat down when he ate. He even reprimanded those who stood or walked while eating or drinking.

In the case of sitting in general when he was not eating, the Prophet often sat on the floor in two positions. First is the position of Al-tarbea, where the legs are crossed together in the front. Second is Al-kurfusaan -- this is similar to the Prophet's eating position, but the difference is that he did not lift the bottom, which means he sat completely on the floor.



Chapter 10

Sufficiency

Other than the manner of eating, one interesting aspect of Muhammad is his ethics of consumption. We can also call it the ethics of nutrition. This term is not translated from Arabic, English or other languages but it is the compilation of the Prophet's routines, which occur in many of the hadith. After a long time of studying the Prophet's manners of nutrition, I came up with a suitable word that could describe it all. The word is sufficiency or kifayah in Arabic. Here are some other words I would like to mention to describe the manner of Muhammad:

1. Supplication or Du'a. Muhammad would make a short du'a that is "Bismilla hirrahma nirrahheem", which means "In the name of God, the Most Gracious, the Most Merciful" before and after eating. Not only did he make the du'a but the Prophet also gave thanks to God with a sincere heart. Therefore, he taught all Muslims to thank God for the food he provides for us every day so that we can be alive to see the next day.

2. Healthy or sahah and cleanliness or nadhafah. Muhammad would wash his hands every time before eating. He also taught all Muslims to do so. Also, he would brush his teeth after every meal with sawaak, which is the twig from a tree called Arak or Salvadora Persica. To use this brush, chew the top of the stick until it turns into a brush; then use it to scrub the teeth. Sawaak offers a pleasant taste. It will also work as a guard to help destroy and protect teeth from bacteria. Moreover, it can help cure gum disease.

Beside watching hands and brushing teeth, what the Prophet did sometimes before eating is taking the ablution. Even though it is not necessary to do so, the Prophet agreed that food is one of the things that show the love of God to his people. Not only does it help save humans from hunger but it also can help them live longer to serve God. To eat food that is allowed and avoid bad food are one of a Muslim's duties. To take ablution before eating is one way to give thanks to what God has provided. Moreover, washing the body affords a fresh and clean feeling.

3. Charity or mutasoddik or sadaqah. This is another moral quality of Muhammad. He always cared for others in that they have had enough food to eat. The Prophet once said, "Do not let others go hungry while you are full, you have to take care and share the equal or better quality of food with your neighbours."

4. Thriftiness or muktasid. Muhammad did not eat much and he was never extravagant. He would sit straight up, eat slowly and chew the food thoroughly before he swallowed it. He recommended dividing the stomach into three sections: one part for food, one for water and the last part empty for better workings of the digestive system. He did not recommend overeating. A thrifty eating practice can create thriftiness in other matters.

5. Quality or jawdah or tayyib. Prophet Muhammad would choose to eat only good food of good quality. Therefore, the quality of food is very important for Muslims. Allah clearly said in the Holy Quran that we must only eat good food that is allowed for us so that we will get benefits from it.

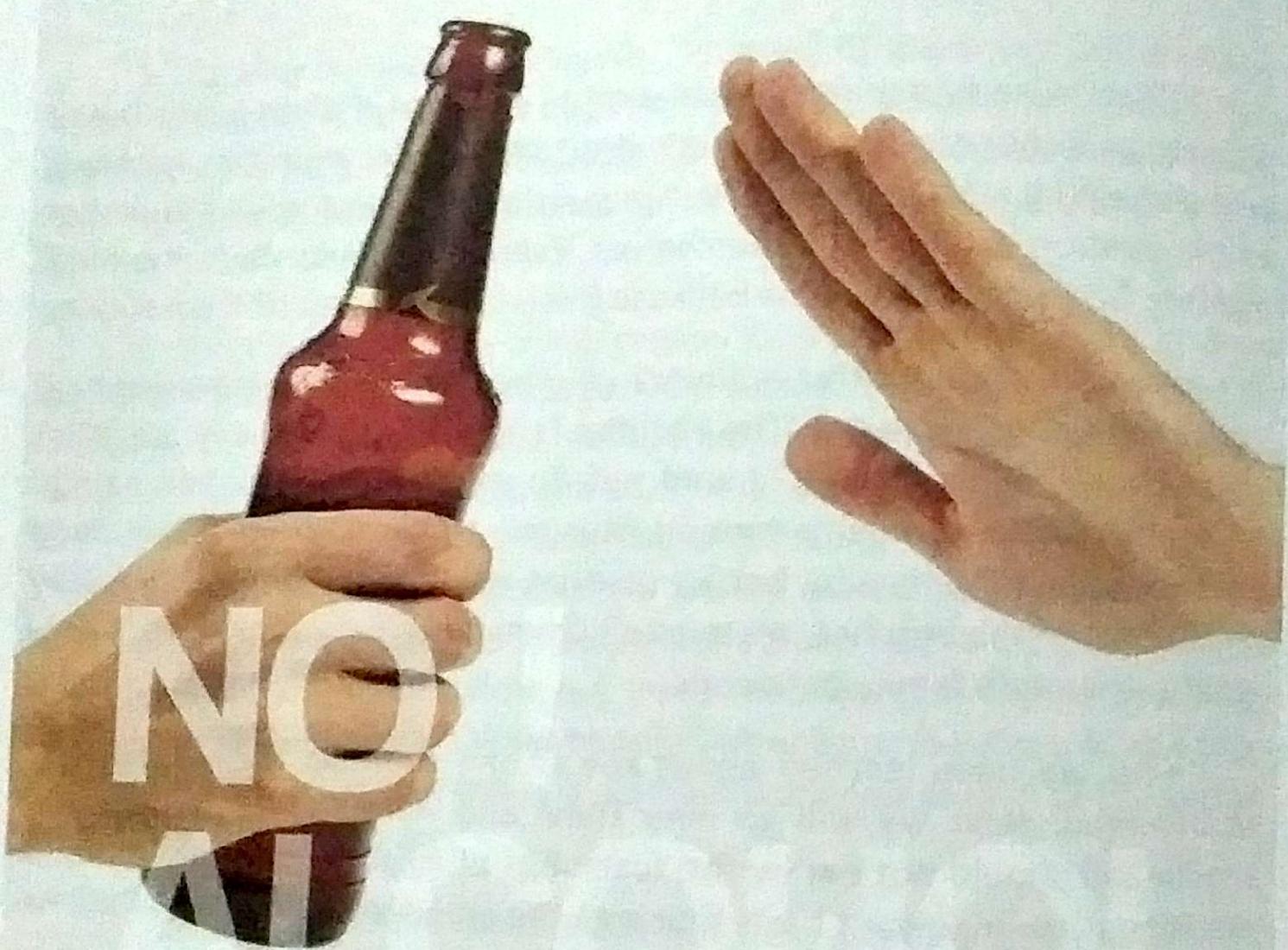
6. Refrain or imtana'a, which means to avoid doing something. Islam requires Muslims and all humans to avoid eating in two conditions. The first is fasting. During the holy month of Ramadan, Muslims are not allowed to eat and drink anything before the sunrise and after the sunset. Ramadan is the 9th month in Arabic calendar, and fasting is one of the Islamic pillars. Secondly, it is forbidden to eat haram food that is considered bad according to the teachings of Islam. Imtana'a can help a lot in developing human resources. To overcome our needs and wants is the hardest thing to do. And food will always draw people's attention. To refrain from eating during some part of a year will help us train ourselves to be a better person in terms of self-discipline.

Imtana'a was an important factor that changed the Arabs, who were known as an impatient group of people, to become a group of people that granted full respect towards the rights of women, slaves, children, the elderly and people from different faiths.

7. Togetherness or ma'an. This is another principal of Islam. Muhammad promoted collaboration in doing activities together; for example, spending time and eating with family. If one has guests come over, they should not let the children eat alone by themselves. Everyone should share the meal together. Do not try to eat alone because this is like being cut off from society.

Islam always supports teamwork whether it is about performing hajj, prayer, work or even eating. The Prophet taught Muslims to pay attention to eating -- that means we should not do other activities while eating. Eating behaviour problems among Muslims today is that we eat food while watching TV, reading books, or even while in a meeting. To follow the manner of the Prophet, we must sit down when we eat, and we should eat together with family or friends.

Now we have learned about the eating routines and manners of Muhammad. Next we will go over Halal and Haram food, or what we should and should not eat by the teachings of Islam. The Prophet's value of eating is an important basis that sets the standard of the Halal food we know today.



From this verse, we can imply that the teaching of the Prophet Muhammad is the thing that Muslims must follow. Because of this verse in the Quran, Muslims thus refer to the Quran and Al-hadith as the way of living, especially about Halal and Haram issues that are known worldwide today.

Halal means permissible while Haram means forbidden. One of the duties of Muslims is to do what God allows and what the Prophet suggested, and avoid things that God forbids and the Prophet suggested avoiding. The terms cover and designate not only food and drink but also all matters of daily life. Halal and Haram of today mainly focus on food as we can see so many products that come from the Halal economy, which has a value of up to USD 3.2 trillion in the Muslim market alone.

When it particularly concerns food and drink, the Quran says all things are created for the sake of humanity except for some things. These we call haram, as mentioned in chapter 2 Surah Al Baqarah verse 173:

إِنَّمَا حَرَمَ عَلَيْكُمُ الْمَيْتَةَ وَالدَّمَ وَلَحْمَ الْخِنْزِيرِ وَمَا أَهْلَكَ بِهِ الْفَتَرَةُ
فَمِنْ أَنْضَطَرَ عَنْ بَيْعٍ فَلَا إِثْمَ عَلَيْهِ إِنَّ اللَّهَ عَفُورٌ رَّحِيمٌ

"He has only forbidden to you dead animals, blood, the flesh of swine, and that which has been dedicated to other than Allah. But whoever is forced [by necessity], neither desiring [it] nor transgressing [its limit], there is no sin upon him. Indeed, Allah is Forgiving and Merciful."

We can see from this verse that there are only four kinds of haram things mentioned, which are dead animals, blood, swine and animals that are dedicated to other gods than Allah. The part of "animals that which has been dedicated to other than Allah" is described further in Quran chapter 5 Surah Al Maeda verse 2:

وَلَا أَهْذَى وَلَا أَقْلَى

".....nor of the Sacred Month, nor of the sacrificial animal brought for sacrifice, nor the garlands...."

And dead animal is further described in verse 3 that:

وَالْمَتْخَنَّةُ وَالْمَوْقُوذَةُ وَالْمُرْدِيَةُ وَالنَّطِيحَةُ وَمَا أَكَلَ السَّبُعُ إِلَّا
مَا ذَكَرْنَا وَمَا ذُبِحَ عَلَى النُّصُبِ

"Prohibited to you are dead animals, blood, the flesh of swine, and that which has been dedicated to other than Allah, and [those animals] killed by strangling or by a violent blow or by a head-long fall or by the goring of horns, and those from which a wild animal has eaten, except what you [are able to] slaughter [before its death], and those which are sacrificed on stone altars,..."

All of those are haram food. As for drinking, the Quran mentions that alcohol is as bad as gambling, as in chapter 5 Surah Al Maeda verse 90:

يَأَيُّهَا الَّذِينَ مَاءَنُوا إِنَّمَا الْخَنَّرُ وَالْمَيْسُرُ وَالْأَنْصَابُ وَالْأَرْلَمُ يُجْسِدُ مِنْ عَمَلٍ
٩٠ أَلَّا شَيْطَنٌ فَاجْتَنِبُوهُ لَعَلَّكُمْ تُفْلِحُونَ

"O you who have believed, indeed, intoxicants, gambling, [sacrificing on] stone alters [to other than Allah], and divining arrows are but defilement from the work of Satan, so avoid it that you may be successful."

Islam calls intoxicants khamru, which means drink such as alcohol, beer, wine, brandy and so on. However, Islamic scholars of today consider all kinds of inebriant things as khamru.

Aside from the forbidden things in the Quran, Muslims also rely on the teachings of the Prophet Muhammad. We can thus see that some haram foods are not stated in the Quran. It is only the recommendation of the Prophet for us not to consume those foods such as donkey meat, animals with fangs and claws, amphibians and diseased animals.

All haram food are there in the Quran and Al-hadith. However, Muslims are all over the world, meaning they come from many different races, cultures and sects. These differences might sometimes cause conflict on ideas and the interpretation of the Quran and Al-hadith. To solve this problem, Muslims have to go back and study the Quran thoroughly. Islamic scholars have to come up with the conclusion of what halal and haram encompass. This decision is called ijma, which means consensus, that is, acceptance of a matter by a specified group of people. In Islamic jurisprudence (fiqh) the matter on which ijma is of interest is understood in one of the two following ways -- any matter related to Shari'ah and any matter of interest to Muslims.

Over time, the world has been changing. Using only the Quran, Al-hadith and Ijma are not enough. Today, there are new problems going on such as the problems of new drugs like Methamphetamine, Ecstasy, Ketamine and so on. These issues are not stated in the Quran, Al-hadith, and Ijma. How do Islamic scholars deal with this problem? There is another way to help solve the problem. In Islam, we call it Qiyas, which means the process of analogical reasoning in which the teachings of the Quran are compared and contrasted with those of the hadith.

These four guidelines of Al-Quran, Al-hadith, Ijma and Qiyas are the main keys to deciding Haram and Halal matters. The knowledge of Haram and Halal is very important. Today, an organization called Codex Alimentarius Commission (CAC), or Codex for short, set a Halal standard. This organization is operated under the World Health Organization (WHO) and the Food and Agriculture Organization (FAO). Codex is responsible for food labels and the standard of food and agricultural products.



Chapter 12

Halal

Halal as in the Quran means permissible by God. Halal is any object or an action that is permissible to use or engage in, according to Islamic law. The term covers and designates not only food and drink but also all matters of daily life. Everything that Islam does not forbid is considered halal. Islam forbids only what stated in the Quran, Al-hadith, Ijma and Qiyas.

The Qiyas makes scientists of the modern world accept the wonderfully up-to-date quality of the Quran, in which its words have never been changed for over 1,400 years.

Back in 1981, Codex had not set the standard for halal products since they thought that religious issues had nothing to do with science. They gave the reasons that religious law is hard to measure in terms of science and that any standard has to be updated at least once every five years, especially when concerned with the standard of food that is closely monitored by the staff of Codex.

Later in April 1981, representatives from Malaysia presented a halal standard for meat products to Codex. They gave the reason that Muslims have to consume meats, but those meats have to be allowed for them by Islamic law. Also, animals have to be slaughtered according to the Islamic process called Zabiha. However, the process of Zabiha among Muslims is different. Thus, Malaysia's representatives presented their idea in the meeting with the Codex committee that Codex should set a standard for halal food so that Muslims from all over the world will follow the same standard.

That event marked the beginning of the halal standard and it was the first time that religious matters were brought to serve as a scientific standard. The meeting of the Codex committee in Asia or CCASIA was held for the first time in India in 1981. At the meeting, representatives of Malaysia suggested the design of a label or a sign that will be attached on halal products. Codex accepted the idea and assigned Malaysia to present their plan in the next meeting.

The presentation of the halal standard outline began in 1982. And there were many more meetings to come because the meeting had been arguing if they should bring religious issues into a scientific standard. Some agreed, but some did not because they couldn't see how they could prove it by scientific means. However, Codex finally brought the halal issue to the consideration of the main Codex office. Later on, Codex did not only set a standard for halal meats but they also changed the whole system of the halal industry.

Over 16 years and 3 months (from April 1981 to July 1997), after the attempts of presenting the halal products to be a universal standard, Codex held a meeting in Geneva, Switzerland, and they certified the halal sign on the label of halal products so that Muslims from all over the world will have the same halal standard. The event marked the first time that Codex accepted halal food as a scientific standard.

The reason why scientists from 165 countries around the world who are members of Codex accepted the making of halal products to be a scientific standard was because they all agreed that what Islam forbids can actually be backed by science. And if the technology will be further developed, the process of standard development will be improved too. Moreover, Islam has set the Qiyas process, which is an important factor that helps make all sides accept halal objects as one of a project of science.

Halal things are from God, as he told us in the Holy Quran. The Prophet Muhammad had described further that we can examine halal things by their cleanliness and safety as in the Quran chapter 2 Al-baqarah verse 168:

يَأَيُّهَا النَّاسُ كُلُّا مِنْ مَا فِي الْأَرْضِ حَلَالٌ طَيْبٌ وَلَا تَنْهَا عَنْ حُطُوتٍ
الشَّيْطَنُ إِنَّهُ لَكُمْ عَدُوٌّ مُّبِينٌ

“O' mankind! Eat of what is in the earth lawful and good...”

This verse explains it all. And it is one of the things that eventually helped bring halal and haram matters to a universal standard.

General Guidelines for Use of the Term 'Halal' (CAC GL-24/1997) is the full name of halal standard. It became the first halal standard of the world. Thailand, as one of the members of Codex, uses this sign. It has been translated into Thai and set as a halal standard in Thailand by the Industrial Products Standard Office. Thailand was one of the first ten countries to have its own halal standard.

After Codex came up with the halal standard, many countries tried to have their own too. For Thailand, the Ministry of Agriculture and Cooperatives has done some changes by making the halal standard to be under the standard of national agriculture and food. The Central Islamic Council of Thailand worked together with the Ministry of Agriculture and Cooperatives. I myself was appointed to be the committee chairman to operate the halal standard of Thailand. Who would have thought that I finally got involved in Thailand's halal standard!



Chapter 13 Standard

Before going deeper in the matter of the halal standard, we have to know what the word standard means. Some people might understand that a standard is only for good things. The truth is it could be bad things as well. Standard is something that is accepted by people and it is tangible.

The word "standard" means something considered by an authority or by general consent as a basis of comparison, an approved model. The International Standard Organization or ISO gives a definition to standard that it is a document that provides requirements, specifications, guidelines or characteristics that can be used consistently to ensure that materials, products, processes and services are fit for their purpose.

Today halal is already a worldwide standard. It is the first time that a religious matter has been involved in science. In the past, some groups of scientists called into question whether religious law could be counted as a scientific standard. Although it is accepted by Muslims, it is hard to update the information since no one can make any changes to the Holy Quran. Therefore, halal is only an Islamic rule.

However, when Muslim scientists understood more about religion and science, they all agreed that haram things can actually be proved by means of science. Something is haram in a spiritual way, but science can also create a rule called standardization, which is the process of using a standard in real life to find a way to control haram in a spiritual way. Moreover, the halal standard can be updated by the process of Qiyas, which comes from the original teaching of God in the Quran.

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The halal standard was born in 1997 by Codex. After that, many countries, including Thailand, set their own halal standard following the process of Codex. In 2011, the Organization of Islamic Cooperation (OIC), which comprises 57 Muslim countries, assigned its own organization under the name of Standard and Metrology Institute for Islamic Countries (SMIIC) to set a new standard for halal products.

Right now we have a halal standard of OIC. In the future, if the member countries of OIC bring this standard to use completely, Thailand and other non-Muslim countries will have to follow it automatically. Therefore, I would like to talk a little bit about the halal standard of the SMIIC. Do not forget that the halal standard of OIC is the standard from the Quran and Al-hadith. The organization cannot make any changes except for adding some new things, following the Qiyyas process only.

The halal standard of the SMIIC began with the food issue called OIC Standards General Guidelines on Halal Food. This standard was developed by a group of the OIC experts. This standard is a basic halal standard in Islam. They do not specify deeper details that might be different in many cultures. Muslims of every background can actually use this standard without questioning anything because it is very basic.

The OIC indicates that Islam focuses on the quality and safety of food. If any food is not safe, it is not halal. Thus, before preparing halal food, it has to be sure that the food is safe. The checking for safety should be in every method of manufacturing such as the process of preparation, production, packaging, transportation, services and so on. We can say that it has to be halal from the beginning to the end. Any organization involved in this halal standard has to follow this rule strictly.

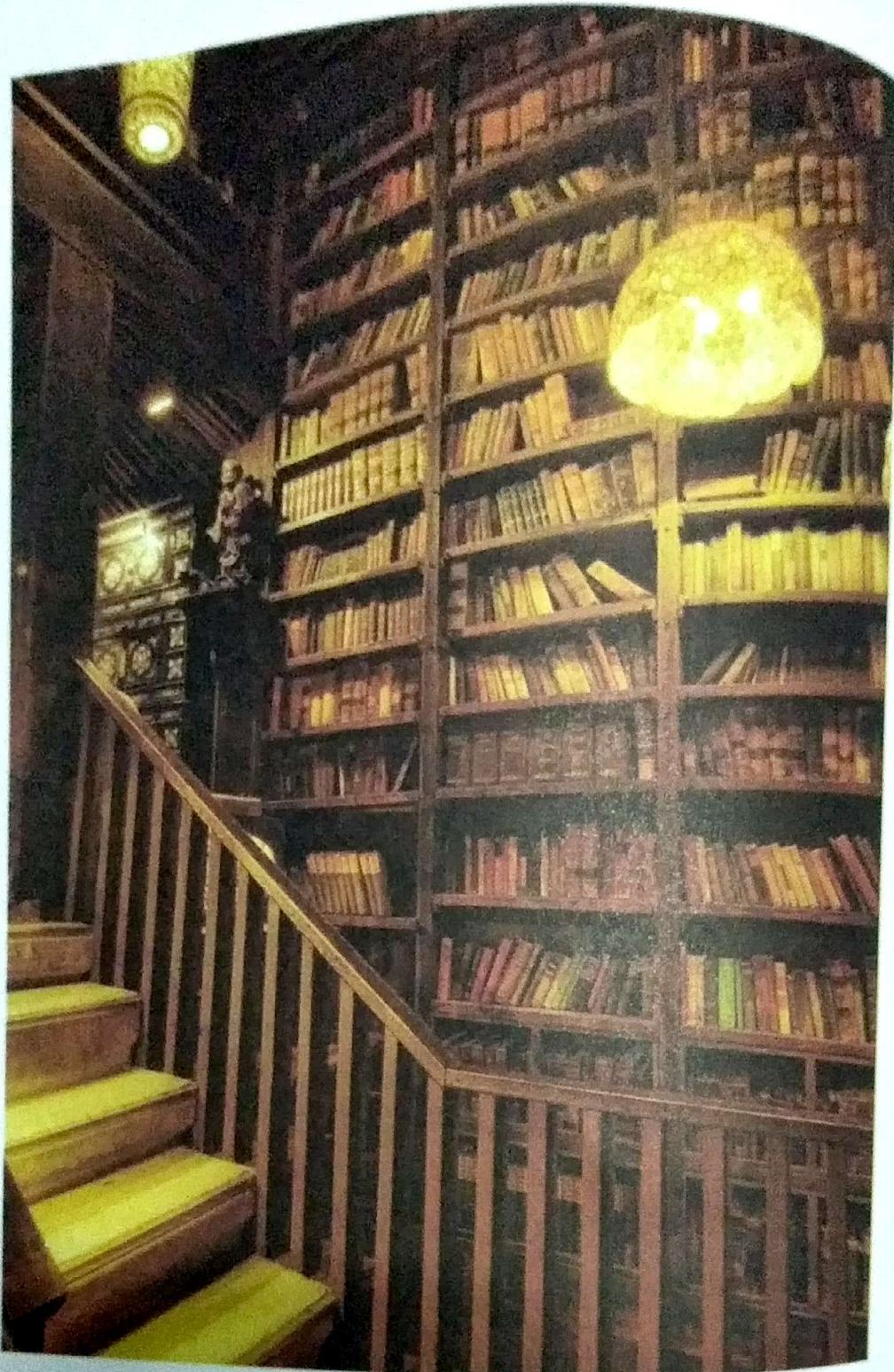
Any organization in the food chain that wants to prepare halal food has to apply the safety process as prescribed in this document:

CODEX STAN 1: General Standard for the Labelling of Repacked Foods, CAC/RCP 1: Recommended international code of practice general principles of food hygiene, ISO 22000: Food safety management systems- Requirements for any organization in the food chain, ISO 22005: Traceability in the feed and food chain – General principles and basic requirements for system design and implementation

The standard is also emphasized on the safety of food under the regulation of the Good Manufacturing Practice (GMP) and the Good Hygiene Practice (GHP). The regulation focuses on personal hygiene and covers the cleanliness of places and equipment used to produce the food. It is to ensure that the food is clean and sanitary in terms of production, storage and distribution.

The most important thing is the definition of the halal food. It means food that is allowed by God for humans to eat. The food has to be permissible according to Islamic law. Any food that does not reach the standard of the OIC might not get a chance to be in the market of the OIC member countries. Thailand has to learn and understand this OIC halal standard as much as possible.

When we see the standard of OIC, it is clear that the OIC is trying to raise the quality of the food for the sake of Muslims all over the world. Accomplishing the plan depends on the collaboration of the 57 member countries too. Although Thailand is not one of the members, we can participate as one of the observers. Thailand can attend meetings of OIC and give opinions, but cannot vote. If we want to export goods to the OIC member countries, following the OIC halal standard is the best thing to do.



Chapter 14 Definition

Now we have known that the halal standard comes from the teaching of God in the Quran and the Sunnah of the Prophet Muhammad. Normally, the process of making a standard begins with the definition. In the case of the halal standard, it follows the standard of the OIC with definitions as follows:

(1) Halal food is the food allowed to be consumed by the law of Islam.

(2) Safety of food is based on the preparation of food that will not cause danger to the consumers.

(3) Food chain is every method that relates to food manufacturing, such as preparation, process of production, packaging, storage, transportation, marketing and so on.

(4) Food additive is a substance added in food to improve its taste, smell and quality. Food additives might be used in the method of manufacturing, the process of production, packaging, transportation and storage. It could be a raw material or an additional material. It might or might not have nutritional values. It also depends on the technology used in the process.

(5) Cold chain is a process of freezing food for preservation or distribution. This process is important for those foods whose freshness and quality need to be maintained throughout the food chain.

(6) Genetically Modified Food or GMF is the food that has been genetically engineered for reasons unrelated to health or nourishment. Genes from an animal, plant, bacterium or virus are inserted into a different organism (most often a plant), thereby irreversibly altering the genetic code, the blueprint that determines all of an organism's physical characteristics, of the organism that received the gene.

(7) Aquatic animals are animals that live underwater. They cannot remain alive on land.

(8) Amphibians are animals that can live both underwater and on land.

Products and services include:

(1) meats and products from meats; (2) dairy products; (3) eggs and products from eggs; (4) grains and products from grains; (5) fat and oil from plants and animals; (6) sugar, candies and dessert; (7) fruit and vegetables and products from fruit and vegetables; (8) beverages; (9) honey and products from honey; (10) supplementary food products; (11) Genetically Modified Food or GMF; (12) food additives; (13) enzymes; (14) microorganisms; (15) containers; (16) places for services and food preparation; and (17) other matters related to food.

Halal food begins from the source of the food. Here are the examples of halal animals: (a) domestic animals such as cows, buffalos, goats, sheep, camels, chickens, ducks, geese and turkeys; (b) wild animals that do not eat other animals such as deer, brow-antlered deer, mountain goats, gaurs and zebras; (c) birds that do not eat other birds such as pigeons, sparrows, starlings and ostriches; and (d) grasshoppers.

Here are the examples of non-halal or haram food: (a) pigs, dogs and animals from the mixing of these two animals; (b) animals that are not cut in the name of Allah; (c) animals that are not cut by Islamic law; (d) dead animals; (e) animals with long teeth or fangs that use such teeth to protect themselves or to hunt other animals such as tigers, bears, elephants, cats, monkeys, wolves, lions, leopards, panthers, foxes, squirrels and so on; (f) hunting birds with sharp claws like hawks, eagles, vultures, crows, owls and so on; (g) venomous animals like rats, centipedes, scorpions, snakes, wasps and other animals similar to them; (h) animals that Islam forbids the killing of such as bees and Hupo birds; (i) donkeys and mules; and (j) any substance or product from non-halal animals are not halal as well.

Aquatic animals that have poison that might cause danger to human health are not halal unless the poisonous part is taken out first. Fish eggs and shrimps are halal. Every kind of amphibians is haram. Food from plants and its products are halal but poisonous plants are haram unless the poisonous part has been taken out.

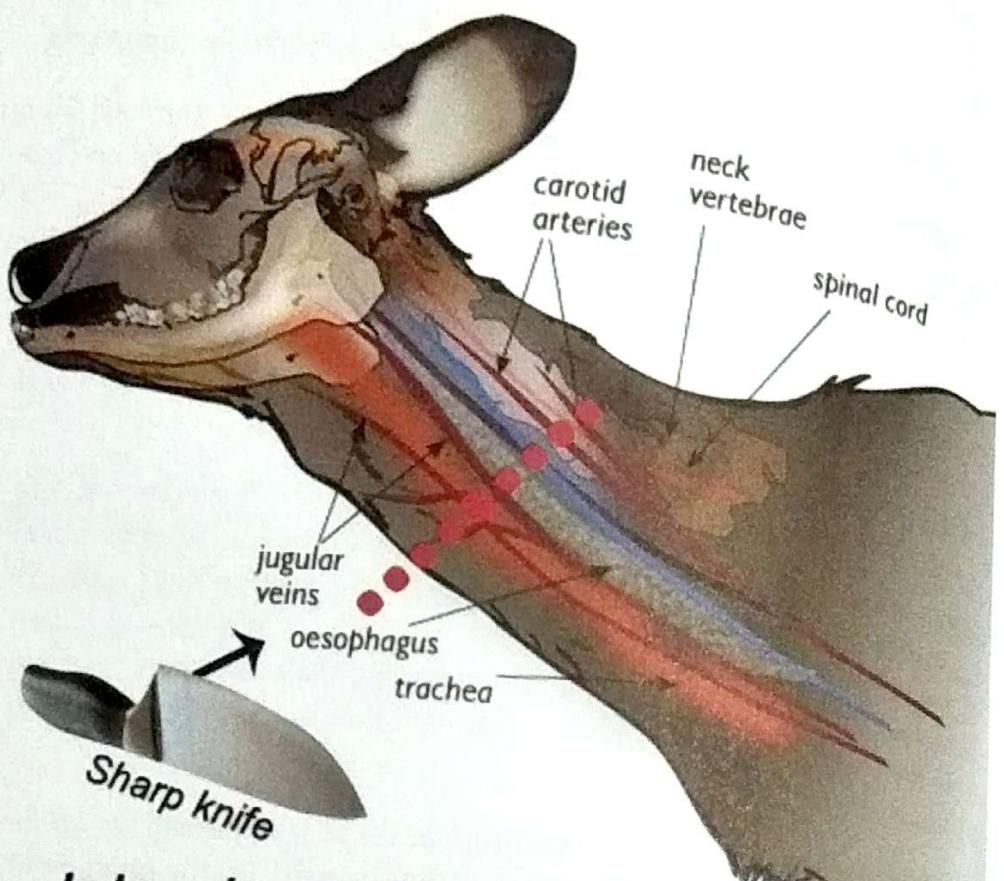
All kinds of blood or an ingredient derived from the non-halal animals is not halal. Liquids from the human body such as urine, stool, placenta, vomit, pus and semen are not halal as well.

To slaughter animals, we have to consider the following conditions:

(a) the animals we want to slaughter have to be halal animals; (b) a vet has to confirm that the animal is healthy; (c) the animal has to be alive before slaughtering and one has to make sure that the animal will not suffer much because humans have to respect the rights of the animal too; (d) the animal should be fed with halal food at least three days before the slaughter, and the animal should abstain from food for six hours before slaughtering; and (e) if the animal has travelled from another place, it should first take a rest before slaughtering.

Who can slaughter according to Islam? Here are the rules: (a) The person has to be a Muslim with a sound mind and he has to understand the basic rules regarding the slaughtering; (b) the person has to have a license from the authority following the Islamic law; and (c) in the case that a Muslim cannot slaughter, it is permissible for a Christian or a Jew to do the slaughtering, but a person from another faith is not allowed to partake in the act.

Equipment guidelines for slaughtering: (a) all equipment has to be clean and is used for the purpose of slaughtering only; (b) the equipment has to be sharp and made of stainless steel; and (c) bones, nails, or teeth as slaughtering equipment is not permitted.



Islamic method of Slaughtering

Chapter 15 Slaughtering

Let's move on a little bit more about the halal standard of the OIC. OIC stands for Organization of Islamic Cooperation. There are 57 member countries with over 1.6 billion people in total -- and the majority of the citizens are Muslims. Now let's talk about the place for slaughtering, the slaughterhouse. This venue has to follow the rules indicated in Codex CAC/RCP1 or ISO 22000. The physical condition of the slaughterhouse should be conforming to the standard prescribed by national law that is: (a) the area of slaughtering has to be convenient for animal health checking; (b) the entrance of the slaughterhouse should have chains and an electric scroll wheel or a system to hang animals; (c) the electric scroll wheel should be installed according to the slaughter order;

(d) the platform for the operation has to be moveable or permanently installed, and it has to be designed particularly for the cow, goat or sheep so that the worker can work on the slaughter easily and effectively; (e) there should be a weighing machine area; (f) there should be an automatic washing area; (g) hot water should be on hand to clean the animals and equipment; (h) antiseptic and sinks should be easily accessible to wash hands; (i) high pressure clean water should be available for multi-purpose usage; and (j) the antiseptic used is suitable for halal food production.

To make the animal unconscious: (a) it is not recommended to keep the animals unconscious and if necessary, choose any of the methods that have been recognized nationally or internationally for example, the use of electricity. The duration of the power and the electricity used to make animals unconscious are defined in the appendix of the OIC standard. The animals have to be alive at the time of the electric shock treatment. The system should be a low-voltage electric system that is applied to the head of the animal only. Also: (b) the power and duration of electric use has to be monitored and determined by a responsible organization regarding the differences in the type and the weight of the animal, including any other relevant factors.

The following is the process of slaughtering animals:

(1) Check the animal's health before slaughtering. Apart from controlling an autopsy, the slaughter of animals involves such requirements: The animals must be given a medical examination including the evaluation of residue rate, use of animal drugs, age of pregnancy and diagnosis that might be an obstacle to the slaughtering, such as Anthrax, rabies and other diseases. If an animal was found to be sick or suspected to be sick, it must be separated immediately in another area. The process of separation must follow the legal formalities. Pregnant animals that are in one-third of the stage of pregnancy have to be omitted from slaughtering. Also, certain diseases such as tetanus and rabies are easily detected if the animals are still alive. But when they have been slaughtered, to observe or detect signs of diseases in the meat will be difficult.

(2) Clean and wash the animals. Before slaughtering animals, ensure that the animals are clean from faecal matter, urine and mud. If the animals are dirty, they should be cleaned in the separate area designated for cleaning. Be careful to not slaughter animals while they are wet.

(3) Prevent the mixing of different types of animals. During the process of slaughtering of animals, be careful not to mix animals of different types together.

(4) Walking the animal to the slaughter area should be performed by people who have received training on regarding this purpose. They can lightly beat the creatures with a wooden stick or gently twist the tail, in the case of the cow. And if they have electric equipment to shock the animals, they are to use the low-voltage in the operation. Another thing to consider at the end of the walkway before the animals will be brought into the slaughter is that the waiting animals will not see those animal before they are slaughtered. Curtains, doors or any other partition can be used to separate them.

(5) Here are the methods of slaughtering:

(a) animals will be slaughtered after being hung or placed by the left facing the direction of Qibla (the direction to the city of Makkah). The one who slaughters them will use their right hand and turn toward Qibla as well. The slaughtering should be as quick as possible to reduce the suffering of animals that are hung or placed in position before being slaughtered.

(b) At the time of slaughtering, the slaughter person will say "Bismillah Allahuakbar", meaning "in the name of Allah, the Greatest". It is not permissible to say a name other than Allah, or the slaughtering is not halal. The mention of God's name should be done every time or with every group of the slaughter so that we can have Zabiha animals, which means the animals died from the method with religious purpose. The operation must then be continued. When begin the new slaughtering, the process will be started again.

(c) Each animal slaughtering must be done only once with a sharp knife. The knife used to slaughter should be lifted only when the cut is finished. Do not lift the knife out of the neck of the animals during slaughtering.

(d) The cut must be on a point just below the Adam's apple, as near the Adam's apple as possible. For a long-neck animal, cut it below the Adam's apple.

(e) A sharp knife is used to cut the trachea (halqum), the oesophagus (mari) and the vein and artery (wadjain and wareed wa sherean) around the neck area in order to accelerate the flow of blood, as well as to accelerate the death of the animals. It takes only 2.5 minutes until the blood completely flows out of the body of the animals.

(6) The inspection of the carcasses and offal. In addition to the general conditions of the autopsy examination, including partial organs of animals, veterinary experts should analyse one more time if the carcasses and offal of the animals are fit for consumption. In the case where certain types of diseases have been detected or suspected, experts have to take the tissue or animal head for additional examination. They will also examine the feet, lungs, heart, skin, liver, spleen, kidney, stomach and intestine both by sight and by hand. If necessary, they may cut a piece of the head, liver, heart, lymph node and other organs for inspection. If they are still in doubt, they would consult a professional expert on the issue. Finally, if the physical check-up result is not clear enough, they will send tissue samples to the lab. Any decision from the laboratory tests will conclude the matter.

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Chapter 16

Products

One important part of the halal standard comes from the Sunnah of the Prophet Muhammad. Now let's learn about the halal standard of the OIC.

(7) The cleaning of the carcass and halal stamp. After washing, the carcass will be hung for sometime until it dries. Then take the carcass to the cold room with an internal temperature of no higher than 4° C. The next step is to determine a point on the carcass to seal the halal sign or Zabiha, as defined by the regulation of the international, national or local level organizations.

The slaughter of poultry is the same as slaughtering other animals in general. In addition, the following method should be applied for (1) the reception of poultry to the slaughterhouse and moving them into the slaughter area: (a) When the poultry have arrived, they should be slaughtered without delay; (b) the slaughtering should be made within six hours after taking the poultry out of the carrier or cage. (2) Conduct a poultry health examination before the slaughtering. During animal control before slaughtering, animals should undergo a medical examination by examining the substance that is left over from the earlier treatment. Diagnose the animals to find a disease that may be the obstacle to the slaughtering. If the animal is sick or suspected to be sick, they have to be separated to an area preparing for them for further examination. (3) The slaughtering method: (a) hold the head of the animal firmly with the left hand, and then press down and cut the throat with a sharp knife by the right hand. The sharp edge of a knife used to slaughter should not be shorter than 12 centimetres; and (b) use the religious criteria as guidelines.

How to slaughter animals: (3.1) slaughtering with cutting machine. (a) The person who controls the machines has to be a Muslim; (b) the person has to say "Bismilla Allahuakbar" before switching the machine on, and he should not leave that place until the work is done; and (c) in cases where the worker needs to be out of the place, he must stop the operation of the machine. He can then start again when the new worker or the old one comes back to the job. Additionally, (d) the knife has to be a sharp knife with a single blade razor, to cut the trachea, the oesophagus, and the vein and artery around the neck area in order to accelerate the flow of blood, as well as to accelerate the death of the animals; (e) the workers have to check individual animals to make sure that they are slaughtered properly -- any animal that escapes from the slaughtering machine must be killed by hand by the workers; (f) the workers must prepare a knife to quickly slaughter them again, if needed; and (g) the blood shed from the animals should be less than 60 seconds so if it is the cold season or winter, the time will increase by 5 to 10 seconds.

(4) The depilation. After slaughtering, the animals should be soaked in warm water at the temperature of 50 to 65 degrees Celsius for 1.5 to 2.5 minutes. Without the use of hot water, hot air can be blown on the carcass instead. (5) To check the body of the animals after death, in addition to the normal control procedures, one should operate the following process: examine the carcasses after washing them according to the specification or standard of the veterinarian.

Carcasses of animals that have light weight due to illness, wounds, bleeding or with a sign of tumour or cancer should be thrown away. If the physical check-up result is not clear enough, send tissue samples to the lab. Any decision from the laboratory tests serves as the conclusion.

Slaughtering of animals other than poultry: (1) fish and grasshoppers do not need to be slaughtered. In case of the fish, they should be caught from the water while still alive and die when out of water. (2) Animals that are hunted and killed in the correct way are considered being slaughtered. If the animals are caught alive, they should be killed according to Islamic law.

Meats and products from meat: (a) meats from halal animals need to be slaughtered according to Islamic law; (b) food additives such as preservatives in meat or meat products must not contain elements that are not halal or have been through a process that did not meet the requirement in Islam.

Dairy products: (a) milk and dairy products are halal; and (b) food mixtures such as fermented food, rennet and gelatine must not be produced from non-halal products.

Eggs and products from eggs: (a) eggs and products from eggs are halal; (b) egg products must not contain non-halal ingredients; and (c) eggs from animals that are not necessarily to slaughter, such as fish, are considered halal.

Grains and products from grain, fat and oil from plants and animals, fruit and vegetable and products from fruit and vegetables, sugar and candies and dessert: (1) grains and products from grains, fat and oil from plants and animals, fruit and vegetables, sugar, candies and dessert must come from the products of the halal process; (2) fat and oil, fermented food, enzymes, hormones, additives, colour, gelatine and a mixture of food similar to the ones used in grain products must not contain non-halal ingredients.

Beverages: (a) water and beverages that are not alcohol are halal except for poisonous drinks that might cause danger to the human body; (b) all kinds of drinks containing alcohol are not allowed according to Islamic law; and (c) food additives such as preservatives and food colouring that are used in the beverages must not be produced from non-halal resources.

Honey and honey products: (a) products from honey like honey and royal jelly is halal; and (b) parts of the bee that drop into the honey and can't be avoided are not considered non-halal. Supplementary food has to come from a halal resource, as well.



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Chapter 17 Hygiene

Checking in confirmation of the halal condition:

Methods of examination and confirmation of halal condition

Checking and confirmation of the halal condition aim to measure and evaluate the possible non-halal contamination that maybe found in halal products. Experts will analyse the sensory factors, tissues, physical condition, and chemical and microbiological elements. They will also monitor blood and the products from blood. The material used to make containers also has to be checked and confirmed if they are recognized nationally or internationally.

Process of checking and confirming the condition of halal products:

(1) The process of making halal products should be checked according to the ISO 22000.

(2) Halal products should be confirmed by the techniques mentioned earlier.

(3) The packages must be stamped with the halal sign according to the OIC standard.

Genetically Modified Food or GMF: (1) genetically modified organisms or GMO, substances or products that contain elements of GMO that are used as raw material in halal products must not be based on non-halal organisms; and (2) GMF that is produced from the moving of genes of other species to halal plants or animals or microorganisms is halal if the genes are from halal organisms.

Food additives are considered food. If the additives come from a non-halal source, it is haram. Enzymes that are used as raw materials should come from halal organisms, too. If any halal product is a GMO product, it should be stated on the label.

Microorganisms that are not poisonous that can cause danger to human health are halal. The production or microbial process of these microorganisms should be halal. Yeast extracts or other products derived from microorganisms should not come from yeast of the beer production process. If the products come from halal GMO, it should be stated on the label.

Packaging: (a) packages or containers should not be made from non-halal material; (b) the factory should not prepare or process food with tools that are contaminated with non-halal things; (c) during the preparation, storage or transportation, the food that is below the standard should be separated; and (d) containers must not cause danger to human health or they must not have been through a process that deals with alcohol.

Places for food service and preparation: (a) every product that is used in the food service places must prove to be halal according to the halal standard; (b) equipment used during the service are for halal food purposes only; (c) non-halal places that wish to be a halal place should pass the process of cleaning and preparation according to the halal standard before starting a halal business; and (d) alcoholic drinks are not allowed in all cases.

The process of food production includes the following characteristics of halal products: (a) the products do not contain non-halal raw materials according to Islamic law; (b) the products are free from any non-halal ingredients according to Islamic law; (c) the products are safe and do not cause danger; (d) the products must be prepared by halal tools and equipment; (e) during the production process, from the preparation and packaging to transportation, each type of food must be separated, and every method must not contain non-halal tools, equipment and ingredients according to the Islamic law.

Machines and other equipment used in the manufacturing process: (a) machines, equipment and containers that take part in halal food production must not be made of non-halal materials and they must be used in halal industry only; (b) in the case of the changing of use from a non-halal industry to a halal industry, the equipment has to pass the process of cleaning and preparation according to the halal standard first before production, and once they have changed to halal product use, they are not allowed to be used in non-halal production again; (c) the oil that is used for maintenance of the machinery or equipment in contact with food should be halal too; and (d) equipment used to weight and measure in the production process that affect the quality of the products or human health should be calibrated properly.

Storage, presentation and transportation: (a) all kinds of halal products that are stored, presented, sold and given services during the transportation stage should be classified and identified as halal food in every instance to prevent the mixture between halal and non-halal food items. (b) The transportation should be related to the nature of the products. In the case of items that need to be transported in the cold chain, the rules of the cold chain practice apply. Transport should also be based on health and hygiene regulations.

Health and sanitation: (a) health and sanitation are necessary in order to prepare halal food. This covers the sanitary conditions of individuals, clothes, equipment and working places that are used to produce food. (b) Halal food has to be prepared, produced, packed, transported and stored in the condition according to the Codex CAC/RCP and other related standards of Codex. (c) Chemicals and materials used in health and hygiene matters should be appropriate for the production of halal food.

The safety of halal food: halal food should be produced, packed and distributed under strict conditions that comply with the Codex CAC/RCP1, GMP, GHP standards stated in the ISO 22000 concerning the safety of all kinds of halal food.



Chapter 18

Labels

Identification and trace back: (a) if necessary, halal food should be classified by a proper method throughout the process of confirmation of their halal condition. (b) Indicate the status of halal food by monitoring and taking measurements according to the standard. (c) Control and record the characteristics of products in various stages for the sake of trace back. (d) ISO 22000 or Codex CAC/RCP1 defines the principles and basic requirements for the design and operation of the traceability system in Halal food production for agencies, so that they can apply the system in various stages in the food chain.

Bringing products to the market: all kinds of halal food that will be stored, presented, sold or delivered should be classified and labelled with the halal sign.

Packaging and labelling:

(1) halal food should be packed properly by using materials or containers that are halal. The process of packaging should be clean, safe and in a sanitary condition. Meats must be packed in clean containers, which should not affect the quality of the meat. The colour of the materials or containers should be white or light cream and they should prevent water contamination but allow the ingress of air. Use of oil and waterproof paper, foil, film, polyethylene bags and poly vinyl chloro allow for oxygen access.

(2) Labelling: in addition to the standard of the ISO 22000 or Codex/ RCP1 and CODEX STAN 1, each package should provide information on the label, including the name of the product, list of ingredients, expiration date, quantity in matrix unit (SI unit), name and address of the factory, importer or distributor, trademarks, code number and batch number. These pieces of information will be used in case tracing back is necessary to find the origin of the products, for instruction and so on. And if any product contains fat or meat or extracts from animals, such as gelatine and rennet, this should be stated on the label as well. GMO foods have to be revealed on the label too. If there is a halal sign on the label, it is necessary to show the name of the organization that granted permission for its usage, together with the appropriate certification number.

For those meat products that came from the slaughterhouse, apart from the requirement stated in ISO 22000 or Codex CAC/RCP1, the label of the products should have the following:

(a) the date of slaughtering; (b) the date of manufacturing; (c) reports or certificates of hygiene from a veterinarian; (d) use of ink that is not harmful to human health when stamped; (e) meat products should be marked by responsible agencies to let the consumer know that the products have been checked by experts and they are safe to consume; and (f) when using the halal logo, the organization that gives permission should be identified on the label too.

Service and distribution: (a) give a name to the service or products; (b) state the date of manufacturing in case the product has no container; and (c) specify the list of food additives (if any) arranged in alphabetical order for each product.

Legal requirements: apart from this standard, halal food must meet the requirements of the law applicable in the country of manufacturing.

In the Appendix: Below is the table with the regulations concerning the use of electric shocks to make animals unconscious by ampere current and time setting:

- (a) Poultry 0.25-0.50 ampere 3.00-5.00 seconds
- (b) Young sheep 0.50-0.90 ampere 2.00-3.00 seconds
- (c) Goat 0.70-1.00 ampere 2.00-3.00 seconds
- (d) Large sheep 0.70-1.20 ampere 2.00-3.00 seconds
- (e) Calf 0.50-1.50 ampere 3.00 seconds
- (f) Castrated calf 1.50-2.50 ampere 2.00-3.00 seconds
- (g) Cow 2.00-3.00 ampere 2.50-3.50 seconds
- (h) Bull 2.50-3.50 ampere 3.00-4.00 seconds
- (i) Buffalo 2.50-3.50 ampere 3.00-4.00 seconds
- (j) Ostrich 0.75 ampere 10.00 seconds

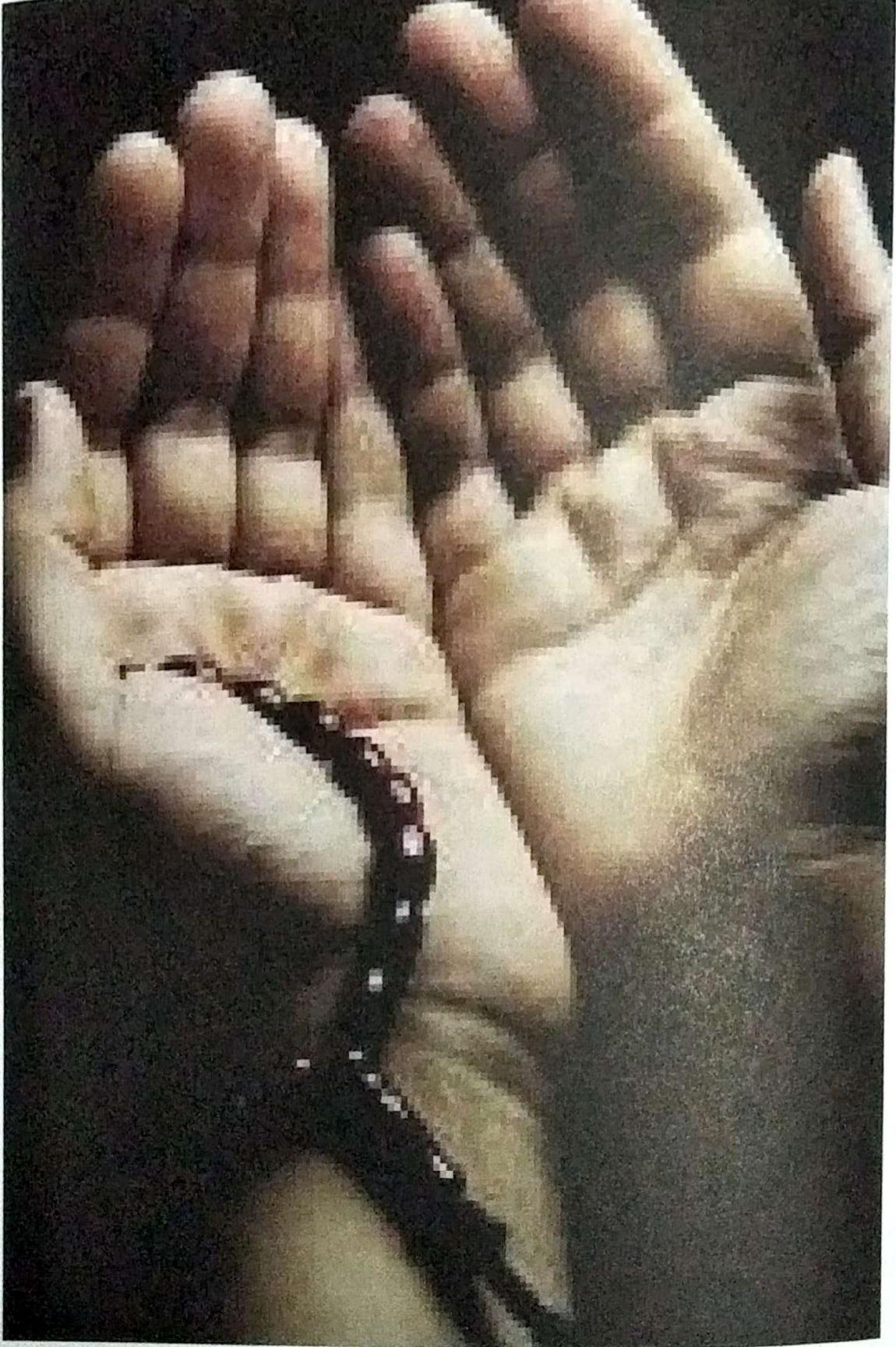
Quantity and duration of the electric current should comply with the body weight of the animal as well as other factors associated with considerations that animals must not suffer from the use of electricity.

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Muhammad
The World's Great Scientist

Chapter 19

Faith

Let's go back and explore the story of the Prophet Muhammad concerning nutrition and medicine a little bit more. In this context, the prophet always mentioned about the benefit of loyalty and faith in God. He said these could help us be healthy, as in the Quran chapter 26 Surah -Shuara verse 80:



وَإِذَا مَرِضْتُ فَهُوَ شَفِيرٌ

"And when I am ill it is He who cures me"

From this verse, we can see that the loyalty and faith in God can actually cure us from diseases. At first, some people might say this is just a metaphor, but there are many medical reports confirming that human faith in God can actually cure many diseases, which is exactly what the Prophet had told us 1,400 years ago. When scholars of modern day confirm such cases, it is pretty obvious that the loyalty and devotion to God can have a positive impact on the mechanisms of disease treatment.

For this reason, the World Health Organization adjusted the definition of the word "health". Before this, they use the word "well-being", which is the well-being of body, mind and society. They came up with the word to help medical organizations all around the world plan their medical operations for the good health of people in their countries. However, after some time, they have found that people cannot be healthy like what they have imagined. They felt that there is something missing -- and that is the health of the soul, which is a spiritual aspect beyond the human mind and emotions.

The health of the soul definitely has a huge impact on humans. This is because there are more than seven billion people in the 21st Century, and over 4 billion people believe in the same God. Over one billion people believe in many gods, and another one billion believe in ghosts and other sacred things. Although there are over one billion atheists out there, one-fourth of these people still believe in the existence of God or sacred things. We can say that almost 90 per cent of the world population still believes in and has some connections to God and supernatural things. And this invisible power can fulfil the health of soul and help fully define the word well-being, making it complete. Therefore, the new definition of good health is all about happiness in terms of body, mind, society and soul.

If we wish to be healthy, we have to take care of four parts: body, mind or emotions, society or environment, and our soul, which is an important part of having good health. A private medical organization called the Mayo Clinic, located in Rochester, Minnesota, USA, has been doing a research project on the health of the soul. They have found that the faith in God or religion is influent in curing diseases. Those who have faith in God or supernatural things will have more courage to fight than those who have no faith in anything. Mayo Clinic came to interesting conclusion, and they devised 12 habits for those who want to have good health. Two out of those 12 characteristics are about the teachings in every religion; that is, the forgiveness and devotion to God and the payment of respect to benefactors.

Spiritual faith according to Islam is divided into two important teachings. They are aqidah, which means article of faith, and fiqh, which are guidelines for practice. These two parts should always be together, meaning we cannot separate them. We cannot have faith without practicing. At the same time, we cannot practice without being faithful. A Muslim believes in the following six articles of Faith: oneness of God, Messengers and Prophets of God, Revelations and the Quran, Angels of God, Day of Judgment and Predestination. A Muslim believes in the ultimate knowledge and power of God to plan and execute His plans. Islam means peace, purity, submission and obedience. In the religious sense, Islam means submission to the will of God and obedience to his law, both by faith and practice.

There are two parts of fiqh; ibadat is the practice part. The Five Pillars of Islam are the framework of a Muslim's life. They are the testimony of faith, prayer, giving zakat (support of the needy), fasting during the month of Ramadan, and the pilgrimage to Makkah once in a lifetime for those who are able. Another part is muamalat, which refers to commercial and civil acts or dealings under Islamic law. The person who is an example of a Muslim in terms of ibadat and muamalat is the Prophet Muhammad. He taught us all about the way of life, even concerning small things such as eating. The Prophet taught us clearly about this matter in that we can call our eating habit Islamic Nutrition.

There are four functions of food, according to international nutrition, as stated below.

- (1) Food sustains life by allowing life to continue.
- (2) Food supplies essential nutrients such as carbs, fat, protein, vitamins, minerals, water and so on.
- (3) Food brings entertainment and happiness. Today, this has become the main function of food.
- (4) Food can give medicinal effects. Many types of food affect the prevention, cure and restoration of our health.

However, these four duties of food are not enough in Islam. There should be one more function added to make the functions of food complete.

The fifth function of food in Islam is that food is a tool to give thanks to Allah or God. To take only halal food and avoid haram food, as stated in the Quran, is one way of paying respect and displaying submission to God. Moreover, the Prophet Muhammad had shown how much he gave thanks to God before and after his meals for the food that help him be alive and able to continue doing the ibadat. This kind of feeling helps Muslims maintain a healthy soul, which is an important part of being healthy, according to many researches in the medical field.

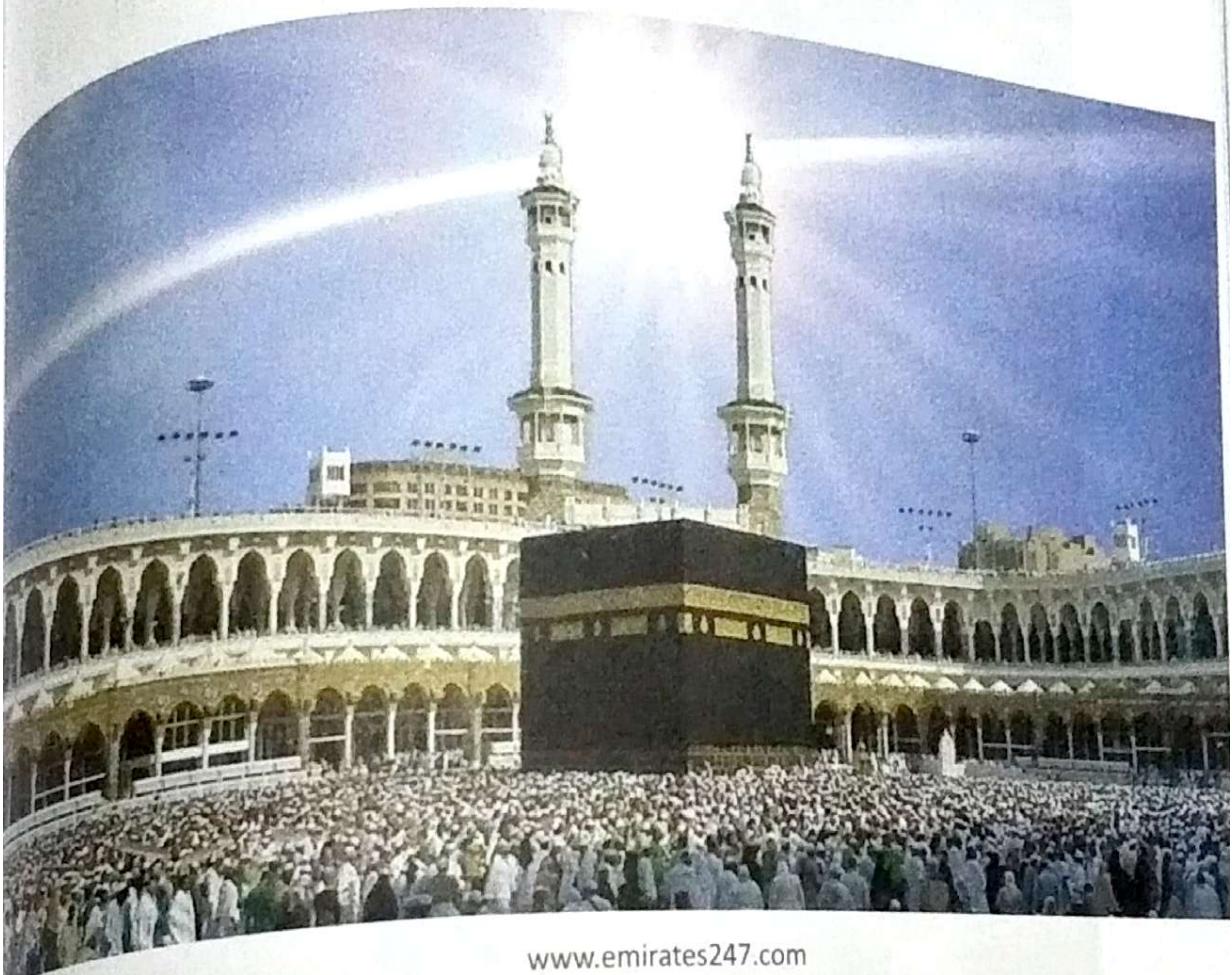
However, one also has to realize that food has both good and bad aspects, which depend on individuals and how they will take care of themselves.

In the Quran chapter 16 Surah An-Nahl verse 67, God says:

وَمِنْ نَمَرَتِ النَّجِيلِ وَالْأَغْنَيِ لَتَحْذِذُونَ مِنْهُ سَكَرًا وَرِزْقًا حَسَنًا
إِنَّ فِي ذَلِكَ لَآيَةً لِّقَوْمٍ يَعْقِلُونَ ٦٧

“Likewise in the fruits of the date-palm and the grapes, from which you derive intoxicants and wholesome food, certainly there is a sign for those people who use their common sense.”

Faith should be practiced together with common sense. When we are wise, many reasons will come forth and they all are related to our faith. The practice of Islam corresponds with academic reasons. Eventually, the benefit of the practice by means of religion will definitely turn back to the doer and his society. For example, prayer teaches us to respect the value of time and it is one form of exercise because it allows one to loosen muscles. Also, fasting is clearly beneficial to our health and it teaches us to have compassion for others. Charity or zakat teaches us about savings and distributing alms to others, which is a silver lining to society. The pilgrimage to Makkah teaches us to realize the importance of sister and brotherhood, and the equality of humans as servants of God. And the Testimony of Faith teaches us to have loyalty, thanks and devotion to God unconditionally. It also produces a positive impact on our health, according to the research of modern scientists and physicians, which confirms the teachings of the Prophet Muhammad 1,400 years earlier.

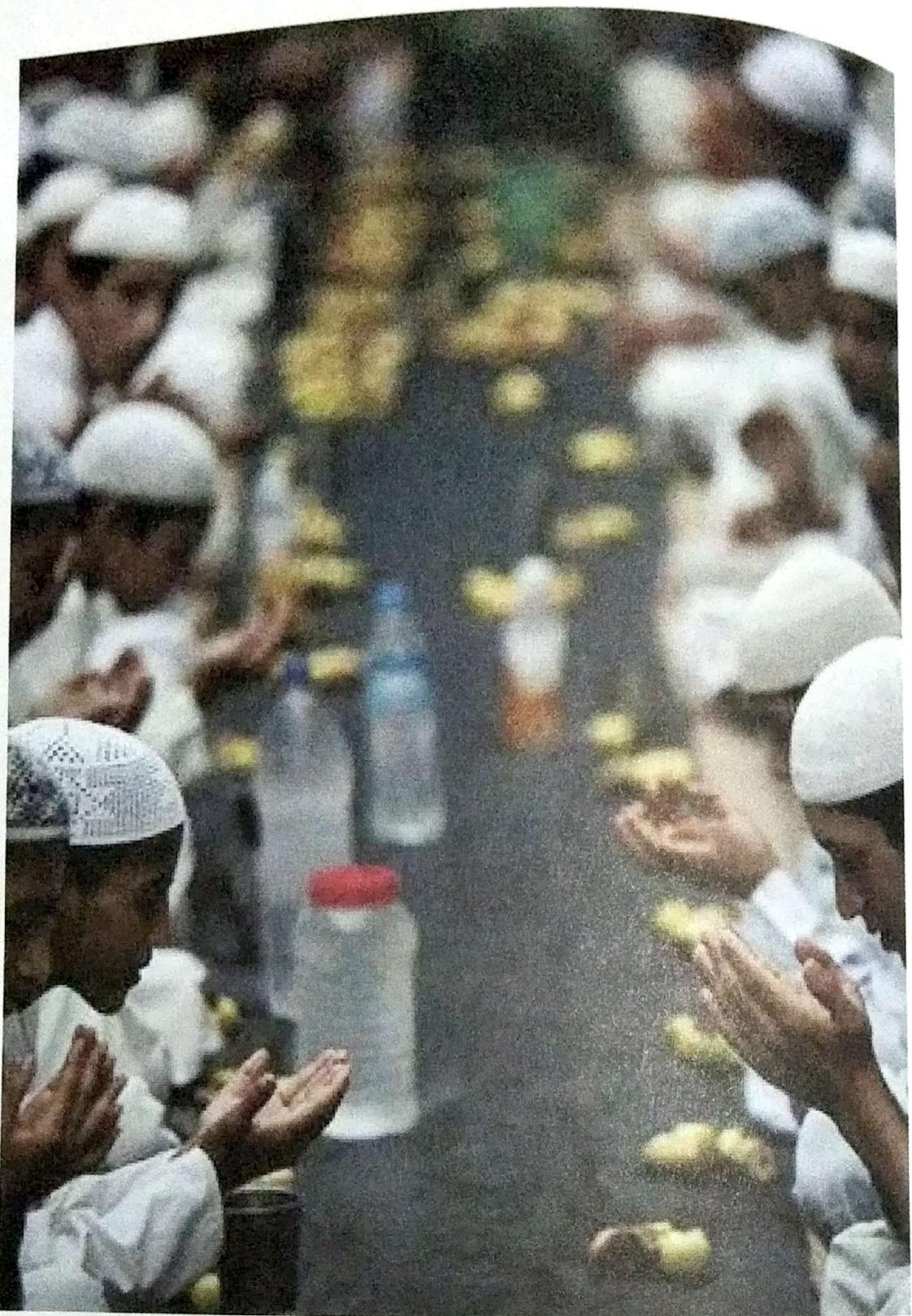


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Chapter 20

Fasting

As mentioned earlier, Islam prescribes the ibadat, or the obedience, submission and devotion to Allah, along with the ultimate love for Him, for believers in the Five Pillars of Islam, including declaration of faith, obligatory prayers, fasting in the month of Ramadan, compulsory giving and the hajj pilgrimage. Fasting is the first religious practice done by the Prophet Muhammad before he was appointed by the Almighty Allah to guide people as the Prophet. When he became an adult, he went to Hira Cave near Makkah to meditate and fast. The practice is similar to what Jewish and Christian people did at the time. The first revelation also came to Muhammad in the cave when he was 40 years old.

It is stated in Verse 183 in the second chapter of the Quran, Surah Al-Baqarah that,

يَأَيُّهَا الَّذِينَ آمَنُوا كُبَرَ عَلَيْكُمُ الصِّيَامُ كَمَا كُتِبَ عَلَى
الَّذِينَ مِن قَبْلِكُمْ لَعَلَّكُمْ تَنْتَهُونَ

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“O you who have believed, decreed upon you is fasting as it was decreed upon those before you that you may become righteous.”

An Arabic word for fasting is sawm, which means to abstain from food, drink, smoking and intimate intercourse before the break of dawn until sunset. Fasting is not that difficult. The first step of fasting is to wake up early and have a meal before the break of the dawn, known in Arabic as sahur, and then refrain from eating, drinking, smoking, gossiping and having sexual intercourse. When fasting, a Muslim should increase the study and recitation of the Quran, do religious practices and exert the utmost in patience and humbleness. A Muslim ends his daily fast at sunset with the evening meal, called iftar.

Fasting in the month of Ramadan is obligatory for Muslims when their sexual senses are observed in the form of wet dreams for boys and menstruation for girls. If a boy does not go through any wet dreams or a girl does not experience any menstruation until the age of fifteen, they are deemed to reach puberty. The religious practice is exempt for children under the age of puberty, mentally challenged people, sick people and women in the period of menstruation or confinement. Travellers may break the fast temporarily during their long journey. As mentioned in the Noble Quran, Muslims are required to fast in order to display their love and loyalty to God. The Prophet Muhammad affirmed that fasting provides Muslims with health benefits, indoctrinates the believers in patience, equips them with a creative sense of good behaviours, and enable them to suffer hunger and thus feel the plight of the poor.

The Prophet Muhammad is the role model of fasting for health. Several medical researches revealed that fasting can improve health, and the correct way to fast is not to eat too much after the iftar dinner. The well-known research about the benefits of fasting was done by Dr. Maximo Maislos, a Jewish scholar born in Argentina who moved to Israel to work as a senior lecturer for medicine at the Ben Gurion University.

Dr. Maislos wondered why the Muslims are stronger during the month of Ramadan. The Arabs were mostly defeated by the Israeli forces in wars between the two sides; however, the troops of Israel were almost lost when they fought with the Arabs in the month of Ramadan in 1973. The medical researcher also conducted a study on the Bedouins, the Arab group that follows the prophetic etiquettes of fasting, including abstaining from food and drink, expending the usual amount of energy, having a meal before the break of the dawn, and ending the daily fast at sunset with not-too-large iftar. According to his research results, a great benefit of adopting the Prophet's manners is a significant increase in the HDL cholesterol levels in the blood, showing a positive sign of healthy heart and good blood circulation. Although Jews and Muslims truly lead a cat and a dog life,

Dr. Maislos has respect for the process of fasting in the month of Ramadan. This Jewish scholar carried out many medical researches into the health benefits of fasting. As a physician, he even introduces the model of Ramadan for obese patients and those with coronary diseases. He set up a health clinic for obesity sufferers and advises them to go on diet by Islamic fasting. This is a clear proof of the great advantages of fasting in Ramadan.

Another example is a hospital in Paris that provided a weight-loss diet program for patients with obesity issues and other complications. The patients have to fast for 45 days, as prescribed by Islamic law on fasting. The director of the diet program explained that the patients have to fast for 45 days, instead of 30 days, because they do not fast with faith and spirituality as Muslims do. If the patients want to enjoy the fruits of fasting as Muslims, they have to fast for another 15 days. This is an interesting idea.

On the other hand, some medical researches indicate that Islamic fasting may produce harmful effects upon sufferers from gout, and kidney and liver diseases. The patients, for whom the religious practice is exempted, must be aware if they still want to fast in Ramadan. Moreover, some other medical researches revealed that the Muslims who get fat after the month of Ramadan take an increased risk of diabetes and heart diseases.

Regarding the latter research results, people suffer from the adverse effects of fasting because of their excessive consumption after breaking the fast. We can see that the period of fasting in many Muslim communities has become an eating festival. People have a large iftar meal and even have an iftar party here and there during the whole month of Ramadan. Different kinds of food are sold in the evening until late at night. As mentioned by Dr. Maislos, the Muslims who are stronger in the month of Ramadan are those who follow the fasting etiquettes of the Prophet Muhammad, and the great example of these followers is the Bedouin Muslims in the Arabian Desert.

Muslims are suggested by the Prophet Muhammad to have a light meal or sahur to start their daily fast in Ramadan. The Prophet stated that sahur is the reward for health, and the best sahur is right before the break of the dawn. Another of the prophetic suggestions on fasting is that Muslims should break the fast immediately at sunset. Moreover, it is strongly recommended that their sahur and iftar should be started by the consumption of a few dates. Based on medical reports, natural sugars from dates raise the blood sugar levels quickly and potassium from the fruit helps relieve stupor and weakness from the fasting person.



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Chapter 21 Medicine

In the last chapter, let's read the stories of the Prophet Muhammad's works on medical care. I would like to make this chapter not very long as there are a number of writings about the Prophet's medical advances. The healthcare covers both disease prevention and cures for ailments, including diarrhoea, oedema, headache, migraine, strep throat, scabies, pox, pain and inflammation. The Prophet Muhammad also made uses of nutrients from honey, animal milk, camel milk and herbs as well as fresh and dry dates. He taught Muslims the benefits of fasting and abstaining from injurious food. Some spiritual treatments suggested by Muhammad are, for example, the power of faith in God and the prayer in Islam. The short prayer strongly recommended is Al Fatiha, a prayer for guidance and mercy of Allah.

As mentioned above, there were a lot of reports on the medical treatments suggested by the Prophet Muhammad; however, he was actually a non-physician scholar. People heavily relied on the Prophet Muhammad since he became a political and spiritual leader of the Arabians. A number of people visited Muhammad as their doctor when they were sick and he advised them based on his medical knowledge together with the faith in Islam. Some advices are prescribed in the Holy Quran. When the patients got well, their faith grew stronger. Please note that the medical treatments about 1,400 years ago were not highly advanced. The Prophet Muhammad's treatments were thus according to the traditional medicines at the time.

The medicine in Arabia several centuries ago was not complex, and it was similar to the medicine in the Byzantine, Persia, India and Egypt, which were the surrounding empires of the Arabian Peninsula. People mostly used only a single herb to cure an illness. The Prophet Muhammad suggested patients to fundamentally take daily food as nutritional treatment and only use herbs when needed. If the former two choices were fruitless, patients could extend the choices to the mixture of several herbs or alternative therapies such as self-induced vomiting, cupping, hot compress, massage and bone adjustment.

Throughout his life, the Prophet Muhammad gave priority to the prevention of disease over the treatment. Prevention covers the state of complete physical, mental, spiritual and social well-being, which is in line with the definition of health given by the World Health Organization (WHO) in the later era. Muhammad mentioned the power of body balance, faith and social condition and their roles for healthcare. A person's healthcare begins with the care of health, control of energy of the body, exercises, obligatory and additional voluntary prayers, reading of the Quran as well as the state of being calm and meditation. What is most important is the faith in the only one God.

As for food and nutrition, Islam teaches Muslims to have all types of nutrients but not to have excessive desire or appetite for food. The fasting for one month during Ramadan is one of the Islamic teachings agreed by modern physicians as a way to improve health and prevent diseases. Islam also teaches Muslims to keep their body and house clean. Community service and welfare are one of the duties of Muslims, as well.

The epidemics spreading during the lifetime of the Prophet Muhammad included leprosy, parasitic diseases and other contagious diseases. The worst one was the plague, which resulted in the largest number of deaths in the northern part of the Arabian Peninsula. Muhammad knew about the hazards of the disease when he, as a young man, travelled with the merchants' caravan to Sham or Syria. He suggested that the Muslims stay away from and not go into the area where the epidemics, especially the great plague, broke out. The Prophet Muhammad said, "If you hear of an outbreak of plague in a land, do not enter it; but if the plague breaks out in a place while you are in it, do not leave that place." (Narrated by al-Bukhari)

Muhammad also advised people living in the land that they had to prevent themselves from diseases by staying only in their residence, keeping calm, eating less, discharging faeces from the body and cleaning the house, including the area around the house. Last but not least, the people in the land should not move to the epidemic-free areas in order to stop the spread of the disease. The suggestion of Muhammad is the best way to prevent further transmission of the disease to others. Muhammad used to predict that the plague would later bring disaster to the Muslim community. After his death, the great plague struck many districts in Syria in the time of Rashidun Caliph Umar. The disease led to over 20,000 deaths of Muslims and many of them were personages in Islamic history.

Nevertheless, some contagious diseases are not epidemics. If we follow the correct methods of prevention, the contagious diseases will not be able to spread to us. The classic example of such diseases is leprosy. The leprosy patients are often shunned by their relatives and friends. Muhammad taught the Muslims to take care of the patients without aversion, just to be concerned about cleanliness and direct contact with patients. The Prophet Muhammad used to have meals with leprosy patients to assure his followers that leprosy is not as deadly as the plague.

One of the important things for the Prophetic treatment guidelines is medication. The Prophet Muhammad said that there is no disease that Allah has created without His creation of its remedy, and Muslims have to seek the remedy using their intellect. The saying has provided Muslims with an impetus towards development in medical science. The Prophet Muhammad expressed that God has made for every disease a cure. Muslims should treat sickness but not with forbidden things. Muhammad was once asked by his followers about the use of alcohol to treat illness and he replied that, "Alcohol is not a remedy but it is a sickness" (Narrated by al-Bukhari and Abu Dawud). The use of haram [proscribed by Islamic law] things as a medicine may make the users understand what is unacceptable in Islam.

However, the Darurah principle makes what is prohibited by Islamic law permissible in times of necessity. When Muslims face considerable danger to their lives, they are allowed to eat or take what is normally forbidden. Verse 173 in the second chapter of the Quran, Surah Al-Baqarah, notes that,



لَا عَادٍ فَلَا إِثْمٌ عَلَيْهِ إِنَّ اللَّهَ عَفُورٌ رَّحِيمٌ

“Whoever is forced by necessity, neither desiring it nor transgressing its limit, there is no sin upon him. Indeed, Allah is forgiving and merciful.”

Suffice to say that Muslims should apply the Darurah principle only in times of necessity and be aware that it is not for making excuses. Because of the Prophet Muhammad's words about the existence of remedy for all diseases and Islamic proscription of the haram, Muslims are encouraged to find medicine to cure the illness. Medical science remarkably flourished in the Islamic Golden Age; moreover, the medical works in this era had a significant influence on the development of medicine in other areas, particularly in the Western societies. Islam teaches its followers to create new knowledge and broaden their horizons. The Prophet Muhammad did emphasize the importance of enquiry from knowledgeable persons.

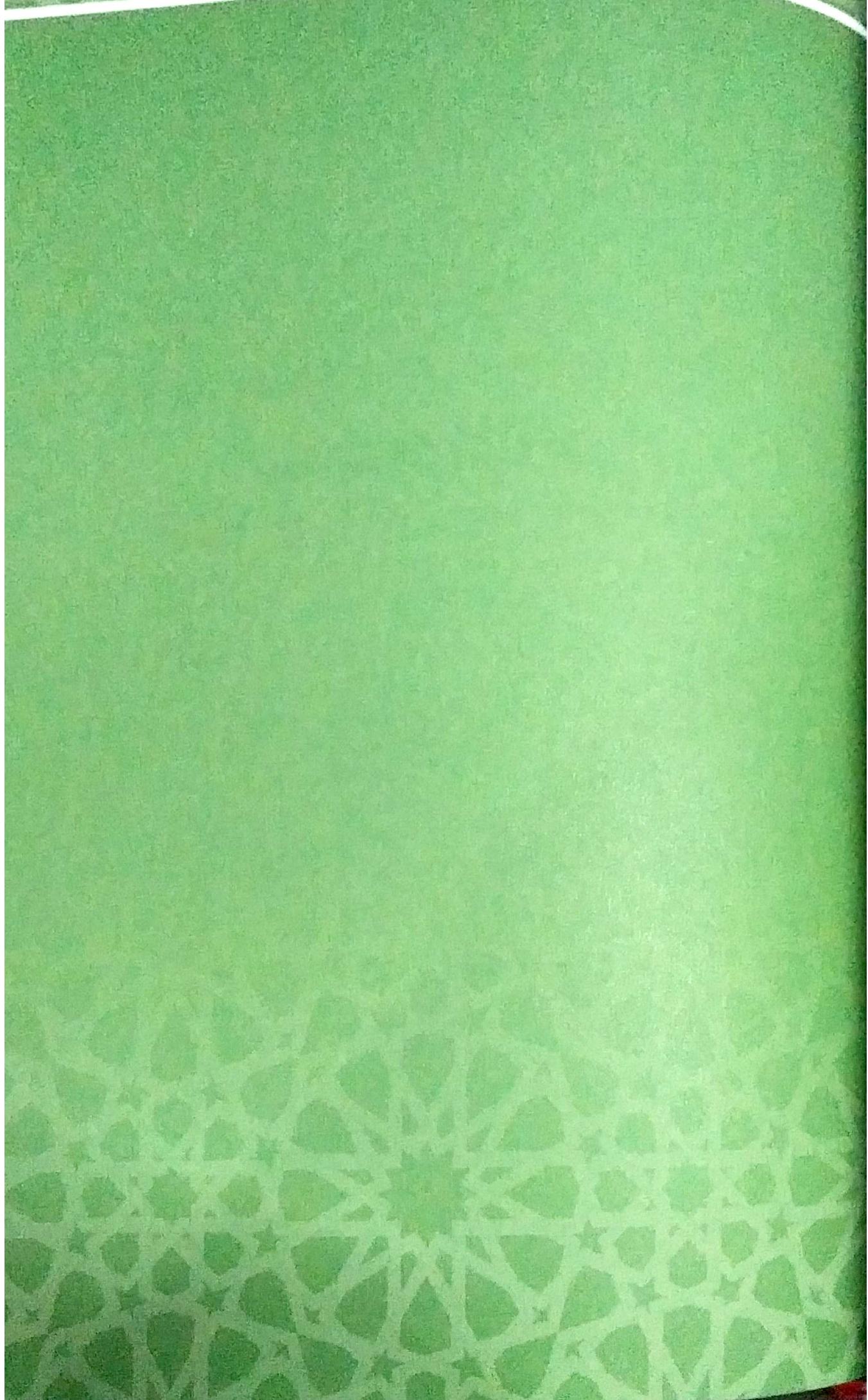
Verse 43 in the sixteenth chapter of Quran, Surah Al Nahl, notes that,

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فَسْأَلُوا أَهْلَ الْذِكْرِ إِنْ كُنْتُمْ لَا تَعْلَمُونَ

"So ask the people of the message if you do not know."

The verse of the Noble Quran carries two meanings. First, it is important to search for informative people to fill the knowledge gaps, and second, it is necessary for society to have knowledgeable people in order to give knowledge to those who desire it. When science and technology were needed to create the highly intellectual society, the Madrasa was established in the early Islamic World. Madrasa is an Arabic word for the educational institution that provides learners with both Islamic teachings and global subjects, especially science. This type of educational institution was generally found in the 8th to 13th Centuries. Unfortunately, the teaching concept disappeared in the era of the Usmaniyah Dynasty. As a result, the Islamic World that was once an intellectual leading society became weakened and has been influenced by other societies.





Muhammad: The World's Great Scientist
Part 3: Brief Biography of the Prophet
Muhammad

Brief Biography of the Prophet Muhammad

571 A.D.

In full Abu al-Qasim Muhammad ibn Abdullah ibn Abdul Muttalib ibn Hashim, Muhammad was born in Makkah, a western city in the Arabian Peninsula. His birthday took place on Monday the 12th in the Islamic month of Robi an-awwal in the Year of the Elephant, which is believed to be on 22 April 571 A.D. (Some experts state that Muhammad was born in 570 A.D. by reason of the confusion between solar and lunar calendars.) His mother was Aminah bint Wahhab and his father was Abdullah ibn Abdul Muttalib. Both of them were of the Quraysh, which was the biggest tribe in the western area of the peninsula. Muhammad's father died of sickness while he was travelling to trade in Syria. At the time, Muhammad was about two months old in his mother's womb.

577 A.D.

When Muhammad was six years old, he accompanied his mother on a trip to Yathrib, later renamed Madinah. On the way back to Makkah, his mother became ill and passed away in Al-Abwa village, about 37 kilometres from the south of Yathrib. His nurse returned to Makkah with the orphaned boy and placed him in the protection of his grandfather, Abdul Muttalib. Abdul Muttalib looked after Muhammad for two years and passed away. After his grandfather's death, his uncle Abu Talib who worked as a caravan merchant raised Muhammad. Muhammad did not have a chance to study but he gained considerable experience of trading from his uncle.

583 A.D.

At the age of 12, Muhammad embarked on a long journey with his uncle in the merchants' caravan to Sham (the region that covers Syria, Lebanon, Palestine and some parts of Iraq at present). His second journey to Sham was at the age of 15. On this journey, he acted as caravan agent for his uncle's business and for a wealthy tradeswoman named Khadijah bint Khawalayd from the tribe of Asad. From the age of 12 to 19, he also accompanied another uncle, Suber, on many trips to Yemen or the southern part of Yaman. Muhammad travelled with merchants in caravan to Sham and Yaman several times in service of the wealthy Khadijah who was very impressed with his complete honesty and intelligent character.

596 A.D.

Muhammad was medium in height with a fairly lean figure. He featured a big head and broad shoulders. His complexion was light brown from the sun. He had black wavy hair and a bushy beard. His hair would generally reach his earlobe.

When Muhammad was 25, he married the wealthy 40 year old widow, Khadijah bint Khawalayd. Muhammad moved from his uncle's house where he had lived for 17 years to his wife's house. He lived in the new house for 28 years before his migration from Makkah to Yathrib. His marriage to Khadijah proved a very happy one. Muhammad spent his years before and after prophethood with Khadijah, and he remained devoted to her throughout the time of their life together. The wealthy Khadijah took in her last breath in 620 A.D. The couple had six children, including two sons and four daughters. All Muhammad's children predeceased him, except a daughter, Fatimah. She married Ali, son of his uncle, and gave Muhammad four grandchildren, including two grandsons and two granddaughters. Fatimah died six months after Muhammad's death.

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610 A.D.

The first revelation (Wahyu) happened through the archangel Gabriel in a cave called Hira, located on the Jabar An Noor Mountain that was three kilometres from the northwest of Makkah. At night during every Ramadan, Muhammad spent many hours alone in prayer in the cave. The situation in Makkah at the time was in crisis. He was deeply concerned with the social unrest, injustice and widespread discrimination, particularly against women. They were viewed as objects and constantly humiliated. When a female baby was born, the baby was considered a disgrace to the family. Many of the female babies were buried alive. It is generally believed that the first revelation was at night on Monday the 27th in the month of Ramadan, which is on 22 August 610 A.D. The first revelation appears in the Noble Quran, Chapter 96: 1-5. The chapter starts with the word "Read", followed by the mention of a clot of congealed blood and a teaching by the use of a pen. Thus, Islam begins with learning and education. The biological facts were first introduced to mankind. Khadijah became the first convert to Islam and the first child converting to Islam was Ali, son of Muhammad's uncle.

619 A.D.

The Prophet Muhammad and Khadijah had spent ten years spreading the message of Islam and the wealthy couple became a middle class one. However, the positive response was less than they expected. Only 170 people converted to Islam and more than one hundred of the converts had to migrate to Abyssinia located in the south of the Arabian Peninsula. On the 10th day of Ramadan in the tenth year of the spreading of Islamic teachings, Khadijah was taken ill and passed away. Her death is supposedly in November 619 A.D. The Prophet suffered the terrible loss of his wife Khadijah and of his uncle Abu Talib, his guardian and protector, who died one month after Khadijah's death. This year is known as the Year of Sorrow of the Prophet Muhammad. More and more people in Makkah opposed the spread of Islam. Instead of being dejected, the Prophet Muhammad ran against the fierce opposition with the strong determination to succeed in proclaiming his message.

620 A.D.

The Prophet's long journey from earth to heaven is called the Isra and Miraj. It has been described that the Prophet Muhammad travelled to the place that academics believed to be Jerusalem in the Sham Region, in the Isra journey and then ascended to heaven in the Miraj journey where he spoke to God who ordained on the believers five daily prayers. Because of the uncomfortable situation in Makkah at that time, Islamic followers were allowed to pray only two times a day at the beginning.

620 A.D.

Carrying an Islamic message in Makkah became extremely hazardous, and the Prophet Muhammad was at risk of being attacked and assassinated. Soon realizing that there was no hope left for Makkah locals to accept his religion, Muhammad thus looked to the sister city of Ta'if located on the mountaintop 100 kilometres from Makkah. He travelled to Ta'if with his adopted son to deliver the message of Islam but they received a cold welcome, and sometimes suffered physical and mental harm. The time in this city was known as one of the worst experiences in life of the Prophet Muhammad. His hope to use Ta'if as a frontier city of Islam collapsed. To not be harmed, he had to return to Makkah in secret and with help from his fellows.

621 A.D.

After the loss of his wife and uncle, the Prophet Muhammad decided to carry his message to outsiders who came to Makkah at the time of the pilgrimage. During the last Islamic month of Dhu al-Hijjah in 620 A.D., Muhammad met six men from Yathrib who had come for the annual rites of pilgrimage at a hill of Al Aqabah near Mina, the neighbourhood located about eight kilometres to the southeast of Makkah. The Prophet conveyed his message to the six pilgrims, and all of them embraced Islam and trusted in the only God, Allah. They promised to deliver the message of Islam to people in Yathrib and return next year with more people. At the time of the following pilgrimage in 621 A.D., twelve men from Yathrib came and accepted Islam. Five of them had met Muhammad in the previous year. All twelve converts made a pledge to the Prophet, which was known as the First Pledge of Al Aqabah. They returned to Yathrib with a close fellow of the Prophet Muhammad and spread the message of Islam to as many as they could.

622 A.D.

The time of the pilgrimage is in the twelfth Islamic month of Dhu al-Hijjah, and in the year of 622 A.D., the month is believed to be from May to June. The Prophet Muhammad travelled to the hill of Al Aqabah to convey the message of Islam to pilgrims as usual. This time he met 73 men from Yathrib and they turned to Islam. Making the Second Pledge of Al Aqabah, these men promised to protect the Prophet and Muslim migrants who moved from Makkah to Yathrib. The Second Pledge of Al Aqabah served a major role in influencing Muhammad's decision on migrating to Yathrib. His close fellow Abu Bakr accompanied the Prophet Muhammad in his migration in the month of Safar or on 16 July. Due to the danger of the foes in Makkah, they pretended to move to the south and later, not in a hurry, travelled to the north to Yathrib. After a stopover, Muhammad and Abu Bakr arrived in Yathrib on 24 July 622 A.D. Since the migration of the Prophet became a threshold in the shaping of Islamic Ummah, the Muslims dated their calendar from the Prophet's migration called Hijrah. After the time, nearly all Muslims in Makkah migrated to Yathrib.

624 A.D.

After the Prophet Muhammad settled in Yathrib, the town was later renamed Madinah in honour of Muhammad's prophethood. The Makkan foes, however, did not take Muhammad's new success lightly. Early skirmishes led to three major battles between the two sides. The first war was called the Battle of Badr as it took place at the area of the well of Badr located 180 kilometres to the southwest of Madinah. Fought on 13 March 624 A.D., the Prophet Muhammad, along with three hundred Muslims, won against a thousand Makkah people in the first battle. The second Battle of Uhud happened on 19 March 625 A.D., while the biggest and third Battle of Trench took place on 31 March 628 A.D. The Muslims retained a stronghold of Madinah after the three battles. At the time, the balance of power had shifted radically away from the once-powerful Makkah toward Muhammad and the Muslims.

630 A.D.

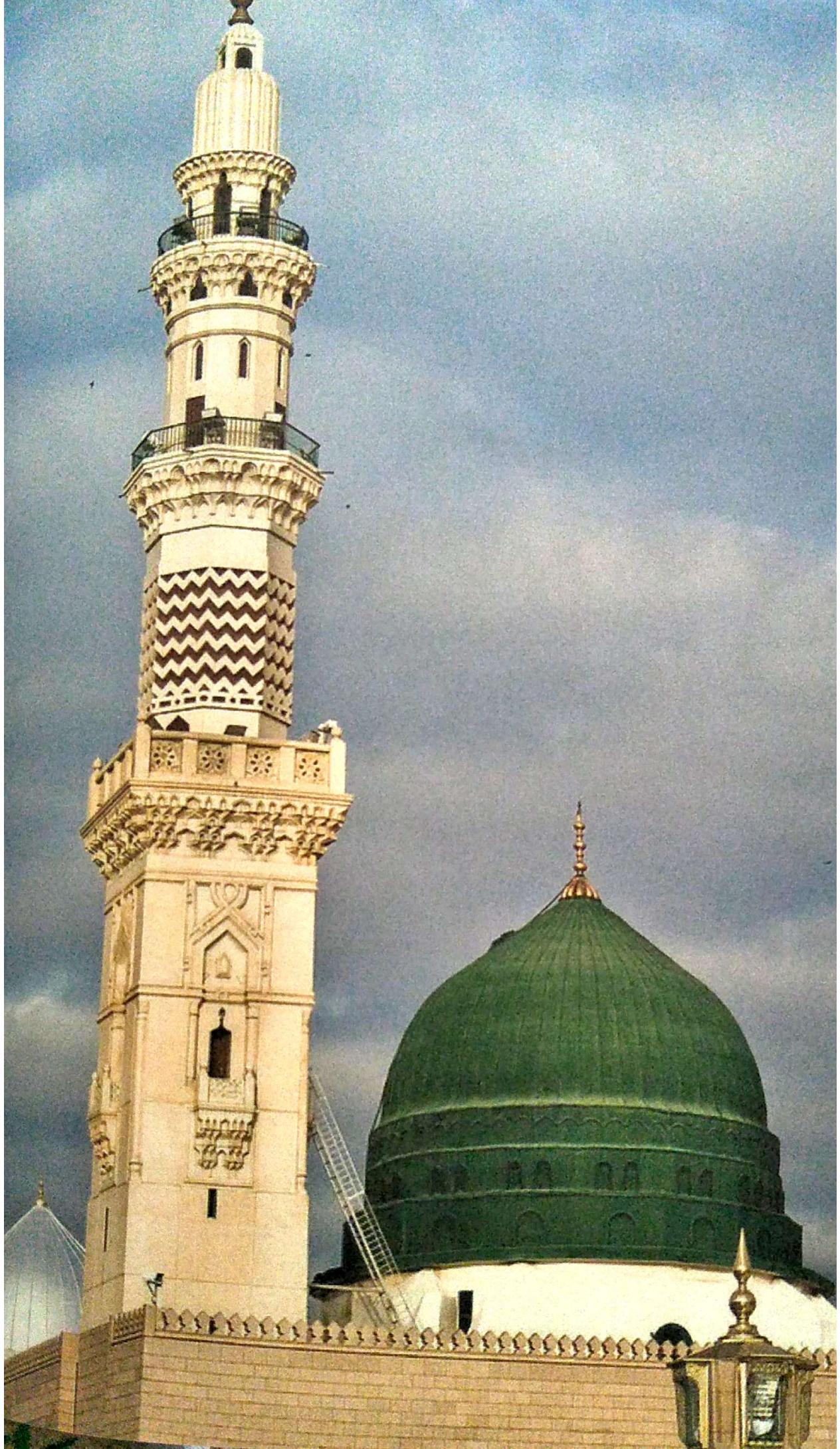
On the 10th day of Ramadan 6 AH, corresponding to 11 January 630 A.D., the Prophet Muhammad and a force of ten thousand men surrounded Makkah. They entered the city on 21 January and the day was considered a complete victory of the Muslims over the Makkans. The victory took place two years after the two sides made the Treaty of Hudaybiyyah in the community of Hudaybiyyah located 14 kilometres to the north of Makkah. The treaty helped to decrease tension between the two cities and authorized Muhammad's followers to return the following year in a secure pilgrimage. After the complete victory without bloodshed, non-Muslim historians generally considered the Prophet Muhammad as a highly regarded victor, and agreed that no conqueror was as kind to enemies as Muhammad. The Prophet's mercy on the Makkans was followed by Mehmed II when he conquered Constantinople on 29 May 1453 A.D. After Muhammad conquered the Makkan foes and established the new regime in the city, he returned to live in Madinah.

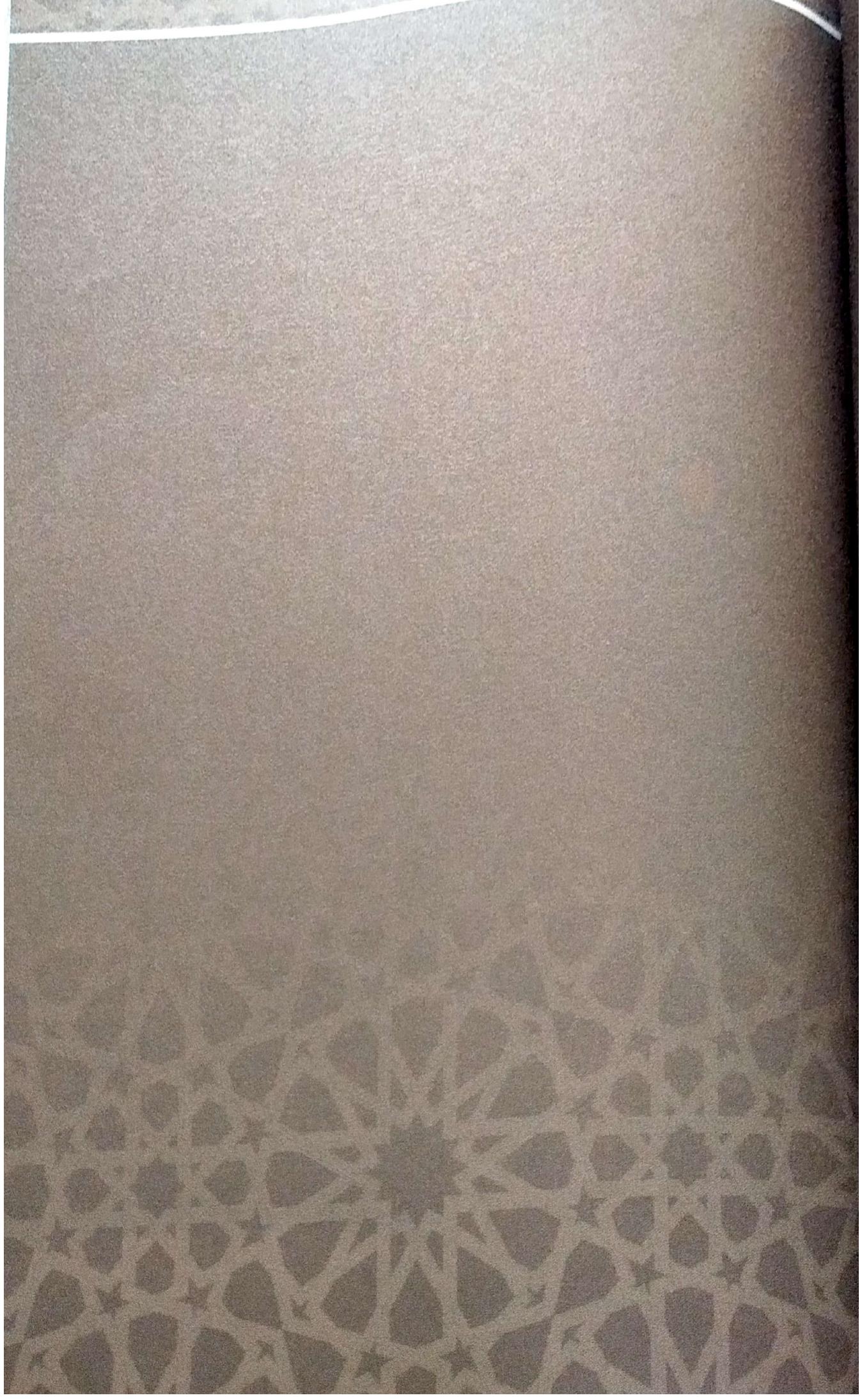
632 A.D.

In the month of Dhu al-Hijjah 10 AH, corresponding to March 632 A.D., the Prophet Muhammad went with the Muslims through the Valley of Mina to Madinah. He taught them how to make the pilgrimage and it was known as the last and only hajj pilgrimage. Up to the Mountain of Arafat, 14 kilometres to the southwest of Makkah, the Prophet stopped the Muslims and delivered his Farewell Sermon.

632 A.D.

After the farewell pilgrimage, Muhammad fell ill and passed away at the age of 63 in the house of his wife Aishah on Monday, 8 June, corresponding to 12 Rabi al-Awal. His body was buried where he died at Aishah's house and the tomb is now under the green dome of Al-Masjid al-Nabawi in Madinah. The Prophet Muhammad was greatly respected by many notables, both Muslims and non-Muslims alike. The well-known historic scholar Professor Arthur Arberry wrote in his book released from Oxford University Press that Muhammad is a man on earth who has changed the world the most. One of the changes is the scientific development, as mentioned in this book.







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Muhammad: The World's Great Scientist
Part 4: Development of Science and Technology
in the Muslim World
and Muslim Scientists in History

◇

Scientific and Technological Development in the Muslim World

610-632 A.D.

The Prophet Muhammad or Abu Al-Kasim (his full name)

Since the Prophet Muhammad received the first verse, he developed society and elevated the Arabic people in the Arabian Peninsula's quality of life through Islamic teachings. He taught the uncivilized group to respect the time, be clean, have self-confidence and believe in the importance of progress. He developed the irrigation system and agriculture, and gave precedence to education, notation, conferences, arts and sciences development, health and wellness supports, dietetics and medical sciences. He had imparted a model, which is an important foundation for the future social development of the younger generations.

610-632 A.D.

The Era of the Four Khalif

The accumulation process of the Holy Quran and hadith fostered the Arabian systematic academic skills, conference development capacity and forum for giving opinions and arguments, which created academic discipline in the people. Such discipline is the foundation for the later science and technology thinking processes.

661-750 A.D.

Umawiyah Dynasty Centralized in Damascus

In the Umawiyah Dynasty, multicultural communities were formed; diverse fields of academics were accumulated; rulers provided academic supports; academic exchanges were made among civilized communities; and astronomy and chemistry were initiated and rapidly developed.

750-1517 A.D.

Abbasiyah Dynasty

The academics, especially in sciences and technology, were most prosperous in this era. It is the golden age of Islam. The rulers supported education, translation of books from all around the world, establishment of publishers, writing and publishing books, founding libraries and planetariums, and teaching sciences in religious schools. Also, the Tower of Wisdom was established in this era. Even though the Mongols conquered Baghdad in 1258 and scientific development was reduced, the science development still proceeded in many places under the governance of the Abbasiyah Dynasty.

756-1492 A.D.

Umawiyah Dynasty and Other Dynasties

Centralized in Spain

Although the Umawiyah Dynasty was overthrown, the governing power of the Umawiyah Dynasty over the Cordoba Kingdom in Spain still continued. The Muslims in the territory of the Umawiyah Dynasty played vital roles in developing arts, sciences and technology along with the Muslims in the territory of the Abbasiyah Dynasty that was centralized in Baghdad. After the Umawiyah Dynasty was brought to an end in 1031, there were some territories in Spain governed by Muslim rulers, such as the Granada Kingdom. Up until 1492, the Muslims created outstanding arts and scientific works.

1517-1924 A.D.

Uthmaniyah Dynasty

At the beginning of this era, sciences and technology development was well extended from the Abbasiyah Dynasty. However, the development decreased at the end of the Uthmaniyah Dynasty due to the pressure from Europe, the frequent wars, the rise of European power and, more importantly, the weakness in following Islamic principles. The Uthmaniyah Dynasty, or Islamic kingdom, was finally overthrown in 1924.

Muslim Scientists in History

Born (A.D.)	Died (A.D.)	Country	Name	Field
	704	Hejaz Khalid	Ibnu Yasid Ibnu Muawiyah	Chemistry
721	815	Iran	Jabir Ibnu Haiyan	Chemistry
740	828	Iraq	Abdullah Almalik Ibnu Alghuraib Asma-i	Biology and Animal Husbandry
777	857	Iran Yuhanna	Ibnu Masawia	Medicine
780	850	Uzbekistan	Muhammad Ibnu Musa Al-Khawarizmi	Mathematics and Astronomy
786	833	Iraq	Al-Hajjas Ibnu Yusuf Ibnu Matar	Mathematics
787	886	Afghanistan	Jafar Ibnu Muhammad Abu Masha Al-Balghi	Astronomy
	777	Iran	Abu Fadhlul Nawbakht	Astronomy
	777	Iraq / Iran	Abu Ishak Ibrahim Ibnu Habib Ibnu Sulaiman Ibnu Samura Ibnu Jundab Al-Farisi	Astronomy and Mathematics
	796	Iraq / Iran	Abu Abdullah Muhammad Ibnu Ibrahim Al-Farisi	Astronomy, Mathematics, and translation
	850	Iraq	Hubesh Ibnu Al-Hasan Al-Azam Al-Dimashghi	Ophthalmology
800	873	Iraq	Yakub Ibnu Ishak Al-Ghindi	Philosophy, Physics, and Ophthalmology
800	873	Iran	Jafar Muhammad Ibnu Musa Ibnu Shakir	Engineering, Astronomy, Geology, and Physics

Born (A.D.)	Died (A.D.)	Country	Name	Field
805	873	Iran	Ahmad Ibnu Musa Ibnu Shakir	Engineering, and Mechanism
808	873	Iraq	Hunain Ibnu Ishak	Medicine, Ophthalmology, and translation
810	873	Iran	Al-Hasan Ibnu Musa Ibnu Shakir	Engineering, and Geology
-	815	-	Yahya Al-Bitrik	Toxicology
828	889	Iran	Abu Hanifa Ahmad Ibnu Dawud Al-Dinawari	Mathematics, and Linguistics
836	981	Turkey	Thabit Ibnu Ghurah Ibnu Marwan	Astronomy, and Mechanism
808	864	Iran	Ali Ibnu Saleh Rabban Al-Tabari	Medicine, and Mathematics
-	845	Iran	Abu Sa-id Al-Darir Al-Jurjani	Astronomy, and Mathematics
868	929	Turkey	Abdullah Muhammad Ibnu Sinan Ibnu Jabir Al-Battani Al-Harrani	Mathematics, Astronomy, and Engineering
-	867	Uzbekistan	Abu Al-Abbas Ahmad Ibnu Muhammad Ibnu Kadir Al-Faghani	Astronomy, and Civil Engineering
865	924	Iran	Abu Bakr Muhammad Ibnu Zakaria Al-Razi	Medicine, Ophthalmology, and Chemistry
870	950	Turkistan	Abu Nasri Muhammad Ibnu Al-Farak Al-Farabi	Social Sciences, Logic, Science, and Music
-	873	Iraq	Hunain Ibnu Ishak Al-Ibadi	Medicine
850	930	Egypt	Abu Kamil Chuja Ibnu Al-Salam Ibnu Muhammad Ibnu Chuja	Mathematics

Born (A.D.)	Died (A.D.)		Name	Field
	892		Yuhanna Ibnu Bughischu	
	990	Iran	Abu Hamid Ahmad Ibnu Muhammad Al-Saghani Al- Astelabi	Medicine Astronomy
903	986	Iran	Abdullah Al-Rohman Al-Sufi	Astronomy
	912	Palestine	Abu Abdullah Muhammad Ibnu Ahmad Ibnu Sa-id Al-Tamimi	Chemistry
	923	Iran	Abu Al-Abbas Al-Fadhl Abnu Hatim Al-Nairisi	Mathematics, and Astronomy
930	1030	Iran	Ahmad Ibnu Muhammad Miskaweh	Medicine, and Chemistry
	932	Iran	Abu Al-Hasan Ahmad Ibnu Muhammad Al-Tabari	Medicine, and Surgery
936	1013	Spain	Abu Al-Qasim Kalaf Ibnu Al- Abbas Al-Sarawi	Surgery, and Medicine
940	997	Iran	Abu Wafa Muhammad Ibnu Muhammad Ibnu Yahya Ibnu Ismail Al-Busjani	Mathematics, Astronomy, and Geometry
943	969	Iraq	Abu Al-Qasim Muhammad Ibnu Haoghal	Geology
951	1029	Spain	Abu Abdullah Muhammad Ibnu Hasan (Ibnu Al-Kattani)	Medicine
960	-	Iraq	Ibnu Washiyah	Chemistry, and Botany
965	1040	Iraq	Abu Ali Al-Hasan Ibnu Al-Hasan Ibnu Hetam	Physics, Ophthalmology, and Mathematics

Born (A.D.)	Died (A.D.)	Country	Name	Field
973	1040	Uzbekistan	Abu Raihan Al-Biruni	Astronomy, and Mathematics
976	-	-	Ahmad Ibnu Abi Al-Ashad	Medicine
-	977	Iraq	Abu Al-Qasim Ubaidullah Ibnu Abdullah Ibnu Ghurdadbih Al-Istaghi	Geology
-	980	Palestine	Muhammad Ibnu Ahmad Sa-id Al-Tamimi	Medicine
-	980	Tunisia	Abu Jafar Ahmad Bin Abi Khalid Ibnu Al-Jazzar	Medicine, Philosophy, and Mathematics
980	1037	Uzbekistan	Abu Ali A-Husain Ibnu Abdullah Ibnu Sina	Medicine
-	990	Iran	Abu Mansur Al-Hasan Ibnu Nuh Al-Ghumri	Medicine
-	994	Iran	Ali Ibnu Abbas Al-Majusi	Medicine
997	1075	Spain	Abdul Al-Karim Ibnu Wafif Al-Laksami	Medicine, and Pharmacology
998	1067	Egypt	Abu Al-Hasan Ali Ibnu Ridhwan Ibni Ali Jafar Al-Misri	Medicine
-	1001	Spain	Ibnu Tumat Al-Maghribi Abu Ali Muhammad Ibnu Muhammad Al-Udalusi Al-Maliki	Astrology, and Medicine
-	1002	Spain	Ibnu Samajun Abu Bakr Hamid	Medicine
950	1009	Egypt	Abu Al-Hasan Ali Abi Sa-id Abdul Al-Rahman Ibnu Yunus Al-Sadafi Al-Misri (Ibnu Yunus)	Astronomy, and Mathematics

Born (A.D.)	Died (A.D.)	Country	Name	Field
997	1074	Spain	Ibnu Al-Wafid	Medicine
1010	1050	Iraq	Sharaf Al-din Ali Ibnu Isa Al-Kahhal	Medicine, and Ophthalmology
1019	1094	Spain	Abu Ubaid Abdullah Ibnu Abdul Al-Aziz Ibnu Muhammad Al-Bakr	Geology
1029	-	-	Al-Hasib Al-Karji	Mathematics
11150	1019	Iran	Abu Al-Faraj Ali Ibnu Al-Husain	Medicine
1150	1087	Spain	Ibnu Ishak Ibrahim Ibnu Yahya Al-Sarghali	Astronomy
1044	1150	-	Ibrahim Ibnu Sa-id Ibnu Ibrahim Al-Maghribi Al-Alai	Medicine
1100	1100	Iraq	Abu Ali Yahya Ibnu Isa Ibnu Jazlah	Medicine
1141	1141	Iran	Muhammad Ibnu Yusuf Irraghi	Medicine
1123	1123	Iran	Ghiyath Al-din Abu Al-Fatih Amar Ibnu Ibrahim Al-Khayyam	Mathematics, and Poetry
1066	1066	Iraq	Abu Al-Hasan Al-Mukhtar Ibnu Abdun Ibnu Batlan	Medicine
1068	1068	Iran	Abu Al-Qasim Abdul Al-Rahman Ibnu Ali Ibnu Abi Sadiq	Medicine
1077	-	-	Abu Al-Qasim Abdul Rahman Ibnu Ali Ibnu Ahmad Ibnu Abi Sadikh Al-Nisaburi	Medicine
1080	1170	Spain	Abu Hamid Al-Gharnati	Geology
1095	-	-	Abu Bakr Muhammad Ibnu Yahya Al-Segh (Ibnu Bajah)	Philosophy

Born (A.D.)	Died (A.D.)	Country	Name	Field
1099	1166	Spain	Abu Abdullah Muhammad Al-Idrisi	Geology
1125	1125	Iran	Ahmad Ibnu Faruk	Medicine
1105	1185	Spain	Abu Bakr Muhammad Ibnu Abdul Malik Ibnu Muhammad Ibnu Tufel Al-Ghaisi Al-Andalusi (Ibnu Tufel)	Philosophy, and Medicine
1061	1120	Iran	Abu Ismail Al-Hussen Ibnu Ali Ibnu Muhammad Ibnu Abdul Samad (Al-Tughri)	Chemistry, and Poetry
-	1153	Turkey	Abu Nasr Adnan Ibnu Nasr Ainsarbi	Medicine
1076	1165	Iraq	Abu Al-Hasan Hibatullah Ibnu Tilmih	Calligraphy, Medicine, Poetry, and Theology
-	1193	-	Abu Nasr Sa-Id Ibnu Abi Al-Khoir Al-Masihi Ibnu Isa Al-Mutababbib	Medicine
-	1198	Egypt	Ibnu Jumay Al-Israii (Ibnu Jami) Abu Al-Makarim Hibatullah	Medicine
1170	1170	-	Abu Al-Qasim Muhammad Ibnu Abdullah Al-Ansari	Chemistry
1126	1198	Spain	Abu Al-Walid Muhammad Ibnu Ahmad Ibnu Muhammad Abnu Rush	Biology, Medicine, Philosophy, and Physics
1135	1204	Spain	Abu Imran Musa Ibnu Ubaidullah Ibnu Maymun Al-Qurtubi	Medicine, and Philosophy

Born (A.D.)	Died (A.D.)	Country	Name	Field
1150	-1150	Turkmenistan	Abdul Al-Rahman Al-Ghasani	Astronomy, Biology, Chemistry, and Mathematics
1150	-1150	Iran	Muhammad Ibnu Ali Ibnu Rustam Al-Ghurasani (Al-Sati)	Engineering
1248	1253	Egypt Morocco	Ibnu Al-Gifti Ali Ibnu Yusuf Shihab Al-Din Al-Gharafi	Medicine Islamic Laws, and Rays
1250	-1250	-	Abu Al-Qasim Ahmad Ibnu Muhammad Al-Iraqi Al-Simawi	Chemistry
1256	1321	Morocco	Abu Al-Abbas Ahmad Ibnu Muhammad Ibnu Uthman Al- Asdi (Ibnu Al-Banna)	Medicine, and Mathematics
	1251	-	Ghaisar Ibnu Abu Al-Qasim	Engineering, and Mathematics
	1258	Egypt	Fath Al-Din Ibnu Uthman Ibnu Hibatullah Ghesi	Medicine
1260	1320	Iran	Kamal Al-Din Abu Al-Hasan Muhammad Al-Farisi	Astronomy, and Physics
	1260	Morocco	Abu Ali Al-Hassan Ibnu Ali Al- Marrakushi	Astronomy, and Mathematics
1273	1331	Iraq	Abu Al-Fida Ismail Ibnu Ali Al- Malik Al-Muaiyid Imad Al-Din (Abu Al-Fida)	Astronomy, and Geology
1274	1348	Syria	Abu Abdullah Muhammad Ibnu Ahmad Ibnu Uthman Al-Dahabi	Medicine, History, and Theology
	1283	Iran	Zakariya Ibnu Muhammad Al- Kaswini	Medicine

Born (A.D.)	Died (A.D.)	Country	Name	Field
1290	1290		Amin Al-Din Rashid (Al-Dim) Walwat	Medicine
-1270	-1270	-	Shams Al-Din Muhammad Ibnu Mahmud Sharasuri	Medicine
1313	1375	Spain	Ibnu Al-Ghatib Lisan Al-Din Mahmud Ibnu Muhammad	Medicine
-	1344	-	Ibnu Umar Al-Jakhmini	Medicine
-	1348	Egypt	Ibnu Al-Akfani Shams Al-Din Muhammad Ibnu Ibrahim Al- Sinjari Al-Misri	Ophthalmology, and Medicine
-1250	-1250	Syria	Ali Ibnu Abdul Al-Azim Al- Ansari	Medicine
1306	-	-	Ibnu Al-Shatur Al-Dimashghi	Astronomy, and Mathematics
-	1327	Syria	Shams Al-Din Muhammad Ibnu Ali Talib Al-Ansati Al-Dimashghi	Cosmology, and Medicine
1332	1406	Tunisia	Abu Zaid Abdul Al-Rahman Ibnu Muhammad Ibnu Ghaldun	Demography, Economics, History, and Sociology
-	1334	-	Mas-Ud Ibnu Muhammad Sijsi	Medicine
-	1341	-	Muhammad Ibnu Aidamur Ikhjildaghi	Chemistry
1341	1405	Egypt	Muhammad Al-Damiri	Zoology
-	1342	Iran	Al-Jaldaghi Ish Al-Din Aidamir Ibnu Abdullah	Chemistry
1351	-	-	Abu Abbas Ibnu Tanbugha Ibnu Al-Majdi	Mathematics, and Astronomy
-	1357	-	Kasaruni Sadid Al-Din Muhammad Ibnu Mas-Ud	

Born (A.D.)	Died (A.D.)	Country	Name	Field
	1379	-	Jamal Al-Din Muhammad Ibnu Muhammad Aghsarai	Medicine
1380	1429	Iran	Ghiyaseddin Jamsid Ghasani (Al-Ghashi)	Astronomy, and Mathematics
1394	1449	Uzbekistan	Muhammad Tarakai Ulubekh	Astronomy, and Mathematics
	1403	-	Zain Al-Din Ali Ibnu Husain Al-Ansari (Haji Zain Al-Attar)	Medicine
	1599	Egypt	Shadily Sadaqah Ibnu Ibrahim Al-Hanafi Al-Misri	Ophthalmology
1410	1453	Egypt	Ibnu Shahin Al-Sahiri Ghars Al-Din Khalil	Medicine
	1412	-	Muhammad Al-Mahdawi Ibnu Ali Ibnu Ibrahim Al-Sanawbari	Medicine
-1350	-1350	Iran	Muhammad Ibnu Mahmud Amuli	Medicine
	1413	-	Ali Ibnu Abdullah Ibnu Haydur	Medicine
	1427	-	Husain Ibnu Muhammad Ibnu Ali Altarabadi	Medicine
1445	1505	Egypt	Jalal Abdin Suyuti	Autobiography, Islamic Laws, History and Science
1448	1517	Egypt	Al-Ghastallani Ahmad Ibnu Muhammad Ibnu Abi Bakr	Medicine, and Judiciary
	1454	Turkey	Abdul Al-Rahman Ibnu Muhammad Ibnu Ali Ibnu Ahmad Al-Bistami	Medicine

Born (A.D.)	Died (A.D.)	Country	Name	Field
-	1474	Iran	Ghiyath Al-Din Ali Ibnu Amiran Al-Huseni Al-Isfahani	Anatomy, Botany, Meteorology, and Mineralogy
-	1492	Afghanistan	Muhammad Ibnu Yusuf Harawi	Medicine
1495	1561	Iraq	Abu Al-Khoir Ibnu Muslim Al- Din Mustafa Tashkoprusade	Medicine
-1450	-1450	Iran	Imad Al-Din Mahmud Ibnu Mas-Ud Shirasi	Medicine
-	1520	-	Muhammad Ibnu Muhammad (Ghununisade) Ghawnuni	Medicine
1525	1585	Egypt	Taghi Al-Din Muhammad Ibnu Maruf Al-Shami Al-Asadi	Medicine
-1550	-1550	-	Rustam Jurjani	Medicine
-	+1572	-	Muhammad Abdullah Ibnu Muhammad Ibnu Mas-Ud Al- Dari Al-Tafjaruti (Tamakruti)	Public Health
-	1592	-	Husain Ibnu Ibrahim Ibnu Wali Ibnu Nasr Ibnu Husain Al- Hanafi	Astrology, and Medicine
-	1599	Syria	Daud Ibnu Umar Ankati	Medicine
1609	1640	Turkey	Hisarfen Ahmed Selebi	Aviation, and Rocketry
-	1609	Iran	Hakim Ali Ibnu Kamal Al-Din	Medicine
-	1600	-	Muhammad Al-Jilani	Mathematics
-	-1650	-	Muhammad Baghir Yasdi	
-	-1650	-	Nur Al-Din Muhammad Abdullah Ibnu Hakim Ain Al- Mulq Ghureshi Shirasi	

Born (A.D.)	Died (A.D.)	Country	Name	Field
	1659	-	Shihab Al-Din Ahmad Ibnu Ahmad Ibnu Salamah Al-Ghulyubi	Medicine
	1669	Syria	Ibnu Sallum Salih Ibnu Nasr	Chemistry, and Medicine
1670	1747	Iran	Hakim Muhammad Hashim Ibnu Hakim Muhammad Hadi Ghalandar Ibnu Musaffar Al-Din Alawi Shirasi	Medicine
	1778	-	Ahmad Ibnu Abdul Al-Mun-Im Damanhuri	Medicine
	1694	Iran	Ghiwam Al-Din Muhammad Al-Hasani	Medical Poetry, Astronomy, Mathematics, and Calligraphy
1698	-	-	Abdul Al-Muti Ibnu Salim Ibnu Umar Al-Shibli Al-Similawi	Islamic Laws, and Medicine
-1670	-1670	-	Muhammad Mumin Ibnu Mir Muhammad Saman Delami Tunakabuni	Medicine
	-1709	-	Sulaiman Ibnu Sulaiman Muhammad Karim Ibnu Muhammad Wali Ibnu Haji Himmat Ibnu Is Ibnu Hasan	Medicine
1750	1799	India	Tipu Sultan	Rocketry Medicine
	1777	-	Muhammad Ibnu Muhammad Mufti Al-Hanafiyah Bi-Al-Ghuds Al-Tafilati Jurisprudence	

Born (A.D.)	Died (A.D.)	Country	Name	Field
+1700	+1700	-	Bulus Ibnu Ghustantin Al-Malak Shaburi	Medicine
-1750	-1750	Egypt	Muhammad Aghirmani	Medicine
-	1805	India	Hakim Muhammad Sharif Khan	Medicine
-1826	-1826	Iran	Abdullah Ibnu Ahmad Ibnu Muhammad Asfarani	Medicine
-	1828	Iran	Jalal Al-Din Muhammad Al- Isfahani	Medicine
-1880	-1880	-	Ahmad Ibnu Muhammad Salawi	Medicine







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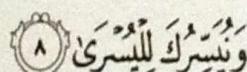
Muhammad: The World's Great Scientist Epilogue

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Epilogue

As a Chinese proverb says, "All good things come to an end". And the book entitled Muhammad: The World's Greatest Scientist has come to its last chapter, the epilogue. Before the conclusion of the book is presented, the writer would like to thank the God -- Allah (be He glorified to the highest), for his mercy. Being placed in the position of the president of the organizing committee of Thailand's 1436 A.H. Mawlidin Nabi Celebration, I was inspired and motivated to devotedly study about Muhammad in order to write the book entitled Muhammad: The World's Greatest Scientist successfully. In addition, I would like to express my gratitude to the recruitment committee of Thailand's Mawlidin Nabi Celebration who selected me as the committee chairman of the festival. I once refused the position of the committee chairman. However, since it was with their consent and, more importantly, Allah's will, I willingly accepted it. Having assumed the position, it is my pleasure to have learned more about Muhammad and that increases my love for Him.

A difficult work must be made easy. Islam also teaches us to do easy tasks because Islam is a modest religion, as it is stated in the Holy Quran (87:8) presented below.



"And We will ease you toward ease."

To write this book, great efforts and diligence were summoned since this task must be accomplished along with the other tasks under my responsibility.

Since there were so many things that I had to do, I had easy ways to complete the work. I started with writing down a narration. There was no chapter or specific topic defined. There were four purposes of writing the narration as follows:

(1) To describe the approach that Muhammad used to develop Arabic society and thus initiated the Muslim world, brought to advanced science development, and became the foundation of today's science and technology

(2) To make the public understand the relationship of Islam and the sciences. They are strongly related to one other. The Muslim societies in the former time had created many of the world's great scientists. The teachings in Islam are important for the scientific and social paradigms that aim at peaceful development, not the extreme and frightening religion it is misunderstood and perceived to be, known as Islamophobia, as we can see in some places in the world at present

(3) To depict Muhammad's state as an everyman, not an angel. This can be seen from the difficulties he faced when he spread the religion, and developed the Arabic society at the same time. As a human being, his perseverance and patience deserve admiration and praise from everyone who has learned and known about him. Definitely, such love for him is a part of the faith

(4) To publish an academic book which mentions Muhammad as a scientist. This is a dimension that is rarely told in the academic world. Besides, it is an honour and pride for this book to be presented to Prince Maha Vajiralongkorn - the Chairperson of the Thailand's Mawlidin Nabi Celebration

Luckily, there is a labour-saving device for those who would like to study the biography of Muhammad, who passed away over 1,400 years ago. The helpful device is the hadith. The hadith that recorded detailed information about Muhammad were written by a group of people who acquainted with Muhammad. Even though some of the hadith are considered as weak hadith, that is not a problem as Islam teaches us to be optimistic. My father, who is an Islamic scholar, suggested that I seek clemency, called rahmah in Arabic, hidden in each difficulty, or balaa in Arabic, as it is said:

تُوجَدُ دائِرَةٌ كَبِيرَةٌ دَاخِلَ الْبَلَاءِ

“Always, there is a clemency hidden in a difficulty.”

What the writer's father has said is also mentioned in the Quran (2:155) as presented below.

وَلَنَبْلُوَنَّكُمْ شَيْءًا مِّنَ الْخَوْفِ وَالْجُوعِ وَنَقْصًا مِّنَ الْأَمْوَالِ
وَالْأَنْفُسِ وَالثَّمَرَاتِ وَبَشِّرُ الصَّابِرِينَ 100

“And We will surely test you with something of fear and hunger and a loss of wealth and lives and fruits, but give good tidings to the patient.”

The difficulty that I encountered was to search for the hadith that were related to sciences. It required experience to analyse the hadith. When the hidden clemency was concerned, the clemency was my experiences, which I had drawn on to achieve such difficulty easily. One of the experiences was my 20 years experience of being a science and technology columnist for Siamrat Magazine, which allowed me to read a lot of articles written by the US's Defense Advanced Research Projects Agency (DARPA). This agency supports researchers throughout the US who do helpful studies for national defences.

DARPA firstly seeks research projects of universities in the US, which were denied scholarship for the research conduction. That is to say, the researches that were thrown in the rejected basket will be considered by DARPA. If any of these researches were considered interesting or useful for the national defences, the researchers will be invited to DARPA. Interestingly, such researchers brought about many studies that we are familiar with, such

as low earth orbit satellites, stealth aircrafts, Global Positioning System or GPS, nano-robots, bimolecular robots, side by side with the Internet development. When I studied about DARPA's endeavour to seek interesting researches in the rejected basket, it reminded me of the hadith reported by Imam Bukhari. It was clemency hidden in the difficulty for me to have the chance to study the hadith reported by Imam Bukhari -- selected and thrown in the rejected basket by him. I can say that it was more than worthwhile.

In 826 A.D. (210 A.H.), Imam Bukhari or Muhammad Ibnu Ismail Al-Bukhari, 16 years old, left Bukhara City in Middle Asia (or Uzbekistan at present) to follow his mother and brother traveling to Makkah for the pilgrimage. He took this opportunity to study the hadith prevalent in the Arabian Peninsula. His task was hard work because at that time, the Prophet Muhammad has passed away for 194 years. The evidence and traces to the Prophet were vague. Imam Bukhari spent time screening 70,000 hadith that he memorized, as well as another 230,000 hadith for 16 years. After that, he sought other remaining evidence, and interviewed over 1,000 offspring of hadith reporters living in different places in the Middle East. Later, he selected the hadith based on the criteria he established. He finally screened 7,275 hadith that met the criteria. These hadith, having strong evidence, were accumulated in nine books entitled *Sohiah Al-Bukhari*. As you can see from Imam Bukhari's story, there were 290,000 hadith that were left. They are not fake hadith. Only, the hadith were not qualified based on the criteria he established.

It is a pleasure that the hadith in the basket were picked, interpreted and referred by many hadith collectors and university students in Muslim world in their theses and dissertations. So, these hadith are still in use today.

Some of the hadith proved the Prophet Muhammad's conceptual and practical framework concerning sciences, which is relevant to his personality and practices; for example, his story about irrigation and agriculture, and ecology. Only a few of this kind of hadith were sorted as strong hadith.

This evidence was the clemency hidden in the difficulty. It ensured me to insist that the Prophet Muhammad was a perfect scientist. All of the hadith are the guides, which have been given by the Prophet Muhammad and strictly followed by a great number of people. The guides also lead the Muslims living after the Prophet Muhammad's death to rapid scientific and technology development in less than two hundred years. When we consider the names of outstanding scientists in the Muslim world, we can see that there were many scientists in the same field from various countries. This shows that academic improvement in the Muslim world at that time was widespread. Each improvement went on in multi-social and multi-cultural dimensions that were the foundation of the Muslim world.

That was something that happened over a thousand years ago. Let's look closer. There is a good story about sciences in the Muslim world and I have a tie with it as well. On 28 to 30 December 2014, the Halal Science Center, Chulalongkorn University, along with allied organizations including the Halal Standard Institute of Thailand, the Central Islamic Council of Thailand, the Provincial Islamic Councils, and so on, organized the Thailand Halal Assembly 2014 at the Bangkok Convention Center, Central World, Ratchaprasong, Bangkok. There were 10 activities arranged within this assembly:

- (1) The 7th Halal Science, Industry & Business International Conference (HASIB)
- (2) Thailand Halal Expo 2014
- (3) International Certification Bodies Meeting
- (4) Seminars on Islamic studies
- (5) Seminars on Islamic laws

(6) SME meetings

(7) Keynote speech under the title The Process of Halal Branding Creation by Dr. Jonathan Bilal Wilson from the UK

(8) The debut of a website entitled iamhalal.com

(9) The debut of a book entitled The Directory of Halal Restaurants in Bangkok and the Perimeter, Southern Border Provinces, and Chiangmai

(10) Exhibition of Islamic Sciences

The highlight of this activity was on Monday, 29 December 2014. It was our great honour to have the Prime Minister Gen. Prayut Chan-ocha, and Mr. Aziz Phithakkhumphon, Thailand's Sheikhul Islam, as the chairmen of the opening ceremony, along with Dr. Phichet Durongkhawerot, the Science and Technology Minister, as an attendant and the chairman of the closing ceremony on 30 December 2014. I, as the president of the organizing committee, along with Pol. Maj. Gen. Surin Palare, the secretary of the Central Islamic Council of Thailand; Assoc. Prof. Dr. Pakon Priyakon, the director of the Halal Standard Institute of Thailand; Mr. Anumad Amad, a member of the Central Islamic Council of Thailand and a legislator; and Dr. Surin Phitsuwan, the former secretary-general of ASEAN, took the Prime Minister around the activity areas. The Prime Minister was most interested in the Islamic sciences exhibition as he spent most of his time there, and asked many questions concerning this section.

In the Islamic sciences exhibition area of over 300 square meters, in the Thailand Halal Assembly, there were over 20 boards of information about Islamic sciences, exhibitions of over 10 sample models of Muslim scientists such as the water lifting system for Saqiya Irrigation in the time of the Prophet Muhammad (571-632 A.D.), the astrolabe created by Al-Khawarizmi (780-850 A.D.), the flying object created by Abbas Ibnu Farnas (810-887 A.D.), the elephant water clock created by Al-Jazari (1136-1206 A.D.),

the vertical mill created by Al-Dimashghi (1256-1326 A.D.), which was extended from a work in the Prophet Muhammad's time, a sailboat created by Zheng He or Ma He or Muhammad Jabbar (1371-1433 A.D.) and so on. The Prime Minister and the Science and Technology Minister listened carefully to the explanation about Islamic sciences. Once, the Prime Minister suggested that the information about Islamic sciences must be told to Muslim youths in Thailand so that they will be proud of their foundation concerning sciences in the Islamic world in the past, and they will be more interested in learning about sciences. Then, they will consequently help develop the societies. Hearing that, I thought the Prime Minister understood my intention very well. Also, I would like to tell him that the book entitled Muhammad: The World's Greatest Scientist will play an inspiring role for Muslim youth in the future.

Back 1,400 years ago, in a city located in the Arabian Peninsula, it was puzzling for all the historians that in the time before the Prophet Muhammad's era, there were quite greatly civilized nations around the Arabian Peninsula, such as Sumeria, Assyria, Northern Babylon, Northwestern Persia, Egypt and Western Nabetia, Southern Sabian and Minian, China and India, which were in the Far East. However, the Arabian Peninsula was a shelter for the Bedouins who had a lower form of civilization. The community where the ancestors of the Prophet Muhammad settled and the people in the adjacent communities had lived in the area for long, but these Arabic people never united to find a nation or a kingdom. Not so long after the emergence of the Prophet and his works of spreading Islam in the area, a big change was made among these communities. They not only united and established a kingdom, but they also founded two powerful and great empires within one century after the Prophet Muhammad passed away. The historians conclude that only Muslims could do this — founding two great empires, in the history of humankind. The questions are that how could the Prophet Muhammad do this? How did Islam change the Arabic people and Muslims? In addition, why was the Prophet Muhammad considered a scientist? The questions must be answered and the answers are presented below.

1. The Prophet Muhammad began spreading Islam in Makkah in 610 A.D. with the introduction of the Islamic faith principles (aqidah) side by side with the Islamic practices (shariah). The former places emphasis on the faith in Allah,

and the gratitude to God. The latter emphasizes the practices (ibadat) towards God, mankind, society and the environment (muamalat), while cleanliness and water management systems were adopted as the major strategies.

2. To spread Islam in Makkah, there were many obstacles. After Islam was spread in the area for ten years, there were only less than 200 believers, and most of them had to flee to another city. In 620 A.D., the Prophet Muhammad's wife and uncle, the Prophet's important supporters, passed away in about the same period of time. In addition, the obstacles of the spreading of Islam increased so the Prophet had to work harder. The mission of spreading Islam to people who made the pilgrimage in Makkah and Aqobah, a city near Makkah, became more successfully, especially among Yathrib people. This caused the Prophet Muhammad to move to Yathrib in 622 A.D., which was the beginning of the Anno Hijrah -- the Islamic calendar. To overcome the obstacles associated with the spreading of Islam, the Prophet Muhammad was greatly patient. It showed that he was an excellent man who never gave up, despite the setbacks.

3. The Prophet Muhammad was illiterate, but he placed importance on education, which led to the recording of the Holy Quran. In Yathrib City, or the latter name of Madinah Al-Nabawi, or Madinah for short, the Prophet Muhammad led the Muslims to political development, focusing on irrigation system development for cleaning the locals' bodies, consumption and agriculture. The Prophet showed his personality of an agriculturists and environmentalist. He did emphasize different fields of social development (muamalat) after he worked hard for two decades. The Prophet Muhammad could firstly merge the Arabic people and build a nation. The citizens were driven with faith, risen up with education and instilled with confidence and self-respect.

4. The hadith, which represents the words and actions of the Prophet Muhammad, concerning sciences are prevalent. They -- the hadith regarding astronomy, geology, biology, medicine, dietetics and toxicology, are proved through scientific means in the latter time. Many of these hadith were derived from the Holy Quran. The information from these hadith became important guides for the Muslims to improve their knowledge, especially concerning sciences and technology, during the later Islamic empires.

5. The Prophet Muhammad taught us about dietetics, especially the forbiddance of eating some kinds of food in addition to the foods stated in the Quran, which include: (a) the forbiddance of eating fierce animals with fangs such as tigers, lions, bears, snakes, birds with swooping claws like eagles, falcons, owls and barn owls; (b) the forbiddance of eating the meat and milk derived from jallalah, or animals that eat infected or dirty substances such as donkeys, mules, vultures, dogs, dirty animals, infected animals and so on; and (c) the forbiddance of eating infected animals that come in contact with humans, such as the meat of cows infected by Mad Cow Disease, Bubonic Plague, Ebola and so on. All the forbidden substances mentioned earlier contributed to the better health of the consumers. Later, these and other regulations ordered by the Prophet Muhammad became the main criteria in the standardization of halal food.

6. The Prophet Muhammad mentioned that one of the duties to Allah in the context of food is to be loyal to Him. For Muslims, not to eat food forbidden by God and the Prophet is to be loyal to God as well. Therefore, the halal principles that were followed by the Muslims are obviously the principles of faith. Halal standardized food preparation is done to maintain the Muslim consumers' aqidah, and to ensure the food safety or the tayyib.

7. Islam emphasizes the protection against diseases, rather than the cures. Some food and herbs are used to protect diseases. The Prophet Muhammad suggested many kinds of food to protect us from diseases, such as pomegranates, boiled bran soup with milk and honey or so called talbinah, white cumin or senna, black cumin or habbatus sauda, fenugreeks, lentils, orange juice, honey and so on. These suggestions are congruent to the latest researches regarding nutrition, dietetics and medicine.

8. After the Prophet Muhammad passed away in 632 A.D. for less than three decades, the Arabic Muslims successfully built an Islamic empire. The process started from improving themselves, clinging to the faith in Allah and following and practicing the Prophet's ways (sunnah).

The processes of the accumulation of the Holy Quran's contents and the recording of the hadith developed the educational system, which had the Arabic language as the standard language. Such processes made the Arabs

familiar with the academic process, which built multicultural societies that had a mutual faith, and led to wisdom development and other academic fields, particularly the foundation of sciences.

9. After the Prophet Muhammad passed away for less than 150 years, or during the kingdom of the Umayyah and Abbasiyah, the process of the sciences development in these Islamic kingdoms was active. Books from other civilized worlds were translated. Paper factories, publishers, libraries and planetariums were developed. In addition, schools and universities focusing on the study of faith or iman side by side with sciences or ilmu were also founded. In those educational places, planetariums, the sciences concerning astronomy, mathematics and agriculture were emphasized. Difficult contents of sciences were applied and taught through easier methods, as it is called Al-Fanun al-Harrah in Arabic, or liberal arts in English.

10. After the Prophet Muhammad had passed away for less than 300 years, the Islamic empires were extended to over 15 million square kilometres, covering the Middle East, Central Asia, Northern Africa, Spain, Afghanistan and Western India. There were publishers, libraries, wisdom institutes, schools and universities established everywhere. The knowledge of sciences and advanced medicine was taught. There were Houses of Wisdom or Bayt Al-Hikma, which are advanced academic institutes in Baghdad and many cities. The knowledge spread into Europe. The destruction of Baghdad by the Mongols in the 13th Century decelerated much knowledge of the Muslims, but the Muslims gathered to copy over a hundred thousand books to bring the books out of the town before they were destroyed. This showed the Muslims' great intention to preserve their knowledge and their perceptions regarding the importance of education. No doubt, the development of sciences and other fields in the Muslim world continued.

11. Under the Uthmaniyah Kingdom in the 16th Century, the competition with the Europeans, who had been through the Dark Ages and were going forward to a revival of wisdom, was too tense. It brought the Islamic empire under immense pressure and the use of the Arabic language became weaker.

The theory of separating religion and knowledge, especially in the educational system, was influenced by secularism or almaniyyah, which came from Europe in the beginning of the 17th Century. Besides, the failure of the attempt to provide equality to the multicultural empire led to the educational system, which left only the studies of faith in the schools, while religious studies were reduced in universities. The practices of the Prophet Muhammad were distortedly followed. Many scholars believed that this was the starting point of the breakdown of the sciences in the Islamic world. Consequently, the advanced sciences and technology in the Islamic world declined rapidly.

In the 2000th decade, Dr. Shariff M. Haque of the University of Canterbury, Christchurch, New Zealand, compared the development of the Muslim world and the West in the 21st Century in his study. He presented many interesting points regarding the current Muslim countries. For example, the Muslim countries have 17 times less scientists than the Western countries. They invest in research and development, when compared to their GDP, 25 times less than the Western countries. In addition, the Muslim countries have fewer universities and educational institutes and lower literacy rates. To conclude, the Muslim world lacks knowledge management, development, spreading and application. That is, the current Muslim world is encountering the deterioration of development, which is a reverse of the prosperity of knowledge in the Muslim world in the past, or in the 8th to 13th Centuries. Many scholars agreed that the Muslim world requires urgent educational development. The approach driving the Muslim world in the past was to place importance on both religious and general education. To change the teaching procedure in schools to the mixed method, as was in the past, will give us hope of humanity development amidst the global competition.

With Allah's will, an illiterate man like the Prophet Muhammad was selected to be His messenger for all mankind. That was a clemency. The positive effect of this phenomenon was that the Prophet Muhammad gave priority to education and encouraged his people to have the best knowledge.

The Prophet stated that his people need to seek knowledge even though they have to travel as far as China. He suggested that his people learn since they are in the cradle and until they are in the graves. Other than faith, the prophet Muhammad always emphasized that Islamic believers spend their time on religious practices as they are supposed to, and the rest of the time must be spent on their occupation so that they can make a living and help develop their societies. There is a hadith concerning the Prophet Muhammad's suggestion to Muslims who spend too much time in the mosque rather than on making a living. This hadith is relevant to the order stated in the Holy Quran (62:10):

فَإِذَا قُضِيَتِ الصَّلَاةُ فَلَا تَسْرِرُوْفِ الْأَرْضِ وَابْتَغُوا مِنْ فَضْلِ اللَّهِ
وَإِذْكُرُوا اللَّهَ كَثِيرًا لَعَلَّكُمْ تُفْلِحُونَ ١٠

And when the prayer has been concluded, disperse within the land and seek from the bounty of Allah, and remember Allah often that you may succeed."

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